



UNDERGRADUATE CATALOG 2016 - 2017

Millersville University

Millersville University

Undergraduate Catalog

2016-2017

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Information contained herein was current at time of publication. Courses and programs may be revised; faculty lists and other information are subject to change without notice; course frequency is dependent on faculty availability. Not all courses are necessarily offered each session of each year. Individual departments should be consulted for the most current information.

A Member of Pennsylvania's
State System of Higher Education

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UNIVERSITY CALENDAR 2016-2017

FALL TERM 2016

THU	AUG 25	Orientation for new students admitted for Fall 2016 begins
SUN	AUG 28	Orientation for new students admitted for Fall 2016 ends
MON	AUG 29	Fall classes begin
MON	SEP 05	Holiday (no classes)
FRI	SEP 23	Family Symposium Weekend
SAT	SEP 24	Family Symposium Weekend
SAT	SEP 24	Honors and Awards Convocation
FRI	OCT 07	Fall recess begins after last class
WED	OCT 12	Fall recess ends at 7:00 a.m.
FRI	OCT 21	Homecoming Weekend
SAT	OCT 22	Homecoming Weekend
FRI	NOV 06	Family Symposium Weekend
SAT	NOV 07	Family Symposium Weekend
TUE	NOV 22	Thanksgiving recess begins after last class
MON	NOV 28	Thanksgiving recess ends at 7:00 a.m.
MON	DEC 12	Last day of classes
TUE	DEC 13	
	through	Evaluation period (special class schedule)
SAT	DEC 17	
SUN	DEC 18	Baccalaureate Commencement; End of Fall term

WINTER TERM 2017 (5 weeks)

MON	DEC 19	Winter classes begin
MON	JAN 16	Holiday (no classes)
SUN	JAN 22	Winter classes end after last final examination

SPRING TERM 2017

MON	JAN 23	Spring classes begin
MON	MAR 13	Spring recess begins at 7:00 a.m.
MON	MAR 20	Spring recess ends at 7:00 a.m.
FRI	MAY 05	Last day of classes
MON	MAY 08	
	through	Evaluation period (special class schedule)
FRI	MAY 12	
FRI	MAY 12	Graduate Studies Commencement
SAT	MAY 13	Spring Baccalaureate Commencement; End of Spring term

SUMMER 1 TERM 2017 (4 weeks)

MON	MAY 15	Summer 1 classes begin
MON	MAY 29	Holiday (no classes)
FRI	JUN 09	Summer 1 classes end

SUMMER 2 TERM 2017 (5 weeks)

MON	JUN 12	Summer 2 classes begin
TUES	JUL 04	Holiday (no classes)
FRI	JUL 14	Summer 2 classes end

SUMMER 3 TERM 2017 (5 weeks)

MON	JUL 17	Summer 3 classes begin
FRI	AUG 18	Summer 3 classes end

FALL TERM 2017 (Tentative)

MON	AUG 28	Fall classes begin
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INTRODUCTION

Millersville University

MILLERSVILLE UNIVERSITY 2016 - 2017

AN INTRODUCTION TO MILLERSVILLE UNIVERSITY

Millersville University of Pennsylvania, located in scenic Lancaster County, is one of the 14 state-owned institutions of higher education that make up Pennsylvania's State System of Higher Education.

HISTORY

In the early 1850s, a group of private citizens in Lancaster County decided to sponsor a three-month summer school program that would provide more education for local pupils than what was then available in public schools. The immediate success of that initial program prompted its sponsors to propose that a permanent academy be established. The decision eventually led to the founding of what is now Millersville University.

The academy began in 1854 with the construction of a three-story building containing a small auditorium, two classrooms and housing for 50 students, located on seven-and-one-half acres at the corner of West Frederick and George streets in Millersville. In 1855, just as the building was nearing completion, the trustees saw an opportunity to promote the new school by offering its free use to J.P. Wickersham, the superintendent of Lancaster County Schools, who was searching for a place to hold a three-month teachers' institute.

Wickersham opened his Lancaster County Normal Institute on April 17, 1855, with 147 students each paying \$34 for room, board and tuition for the three-month term. Before the term was over, both Wickersham and the academy trustees agreed that the school should become a permanent normal school.

The Lancaster County Normal School, the first school of its kind in the state, opened on November 5, 1855, in Millersville with approximately 100 students. The original academy building, soon known as "Old Main," was expanded and enlarged over the years and served the college in many capacities until it was razed in 1970. The University's 11-story Francine G. McNairy Library and Learning Forum at Ganser Hall now stands on that site.

Two years after the school's opening, the Normal School Law of Pennsylvania was enacted. It divided the state into 12 normal school districts, with Lancaster, York and Lebanon counties forming the second district. The law also established certain minimum requirements for facilities and curricula. The state legislature, however, enacted no funds for the development of the schools. The trustees at Millersville raised \$20,000 from gifts and subscriptions of stock, at \$25 a share, to finance the expansion necessary to meet the requirements of the law.

On December 2, 1859, Millersville was approved as the first State Normal School. When the school passed completely under the control of the state in 1917, all shares were redeemed at the par value of \$25, ending 62 years of private control.

In 1927, Millersville became a State Teacher's College and was empowered to grant the Bachelor of Science in Education degree. In 1959, the College's name was changed to Millersville State College and a master's program in education was added. In 1962, the College was authorized to grant the Bachelor of Arts degree. In 1982, the Pennsylvania Legislature passed Senate Bill 506, creating the State System of Higher Education, effective July 1, 1983. On that date, Millersville State College became Millersville University of Pennsylvania.

In 1988, Millersville began offering courses at several sites in the city of Lancaster. Both credit courses and continuing education opportunities were provided to serve the educational needs of Lancaster city residents, area businesses and nontraditional students. In 2011, a downtown Lancaster campus opened at The Ware Center. In 2012, The Winter Visual and Performing Arts Center was opened to provide a creative hub for students, faculty and the surrounding community in music, art and theatre. In fall 2014, graduate programs began at the PASSHE Center City Philadelphia location. Also in 2014, Millersville University initiated its first doctoral programs, a Doctor of Education in Educational Leadership and a Doctor of Social Work. Millersville University offered its first fully-online undergraduate completion program in fall 2015 in RN to BSN.

Today, Millersville is proud of its beautiful, well-maintained 250-acre campus abounding with reminders of a long history. The bell from Old Main has been carefully preserved and hung in a dramatic tower. The original library, a lovely brick building built around the turn of the century with turrets, stained glass windows and extensive oak woodwork, has been carefully restored and is now Biemesderfer Center, "the centerpiece of the campus," which overlooks a scenic pond with two resident swans.

MISSION

The mission statement of Millersville University was adopted by the Strategic Planning Steering Committee and endorsed by the Council of Trustees on June 19, 2014. Millersville University provides diverse, dynamic, meaningful experiences to contribute positively to local and global communities.

CURRICULUM AND PROGRAMS

Millersville University offers two doctoral programs, 72 bachelor's degree programs and one associate degree program in art, education, humanities, social sciences, mathematics and sciences, most of which offer many options and choices to students. All Millersville undergraduate degree programs include a general education component designed to develop student communication skills and critical-thinking abilities, as well as provide a broad foundation in the liberal arts, humanities, fine arts, and natural and social sciences.

Millersville also offers 18 master's degree programs in art, education, humanities, social sciences, mathematics and sciences, as well as selected certification programs.

A number of special educational opportunities are provided, including honors programs, independent study, internships, study at other institutions and abroad, student-designed majors and academic remediation.

Millersville University's faculty, staff and services reflect the University's concern for student growth and development. There are over 300 full-time faculty members available to advise and counsel students on academic and career-related matters. There are also counseling, career planning and placement, and tutorial services, as well as services for nontraditional students. A wide range of cocurricular and extracurricular activities and cultural events are offered.

ACCREDITATION

Millersville University is accredited by the Middle States Commission on Higher Education, 3624 Market Street, 2nd Floor West, Philadelphia, PA 19104; the Pennsylvania Department of Education; and is approved by the American Association of University Women. Teacher Education programs are accredited by the Council for the Accreditation of Educator Preparation (CAEP), 1140 19th Street, N.W. Suite 400, Washington, D.C. 20036, and the University is a member of the American Association of Colleges for Teacher Education (AACTE). The respiratory therapy program is accredited by the Commission on Accreditation for Respiratory Care (CoARC), 1248 Harwood Road, Bedford, TX 76021-4244. The social work programs are accredited by the Council on Social Work Education (CSWE), 1701 Duke Street, Suite 200, Alexandria, VA 22314. The music programs are accredited by the National Association of Schools of Music (NASM), 11250 Roger Bacon Drive, Suite 21, Reston, VA 20190-5248. The nursing programs are accredited by the Accreditation Commission for Education in Nursing, Inc. (ACEN), 3343 Peachtree Road NE, Atlanta, GA 30326. The chemistry programs are recognized by the American Chemical Society (ACS), 1155 16th Street NW, Washington, D.C. 20036. The computer science program is accredited by the Computing Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET), 415 N. Charles Street, Baltimore, MD 21201. The occupational safety and environmental health program is accredited by the Applied Science Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET), 415 N. Charles Street, Baltimore, MD 21201. The applied engineering and technology management program is accredited by the Association of Technology, Management, and Applied Engineering (ATMAE), 275 N. York Street, Suite 401, Elmhurst, IL 60126. The technology education program is in full compliance with the International Technology and Engineering Educators Association (ITEEA), 1914 Association Drive, Suite 201, Reston, VA 20191-1539. The business administration program is accredited by the Accreditation Council for Business Schools & Programs (ACBSP), 11520 West 119th Street, Overland Park, KS 66213. The school psychology certification program is in full compliance with the National Association of School Psychologists (NASP), 4340 East West Highway, Suite 402, Bethesda, MD 20814. The art and design programs are accredited by the National Association of Schools of Art and Design (NASAD), 11250 Roger Bacon Drive, Suite 21, Reston, VA 20190-5248. The Center for Counseling and Human Development is accredited by the International Association of Counseling Services (IACS), 101 S. Whiting Street, Suite 211, Alexandria, VA 22304.

THE CARNEGIE FOUNDATION COMMUNITY ENGAGEMENT CLASSIFICATION

In 2010, Millersville University of Pennsylvania was one of 121 U.S. colleges and universities to earn the Community Engagement Classification from the Carnegie Foundation for the Advancement of Teaching. Currently, a total of 361 campuses nationwide have gained this important designation. The Community Engagement recognizes collaboration between institutions of higher education and their larger communities (local, regional/state, national, global) for the mutually beneficial exchange of knowledge and resources in a context of partnership and reciprocity.

The foundation, through the work of the Carnegie Commission on Higher Education, developed the first typology of American colleges and universities in 1970 as a research tool to describe and represent the diversity of U.S. higher education. The Carnegie Classification of Institutions of Higher Education continues to be used for a wide range of purposes by academic researchers, institutional personnel, policymakers and others.

The application process for the Community Engagement Classification is administered by the New England Resource Center for Higher Education (NERCHE). All information about the Community Engagement Classification and the list of classified institutions can be found on the NERCHE website at www.nerche.org.

THE STUDENT BODY

Millersville University enrolls approximately 8,000 students. Approximately 80 percent are full-time undergraduates; the rest are part-time undergraduates and graduate students. About 56 percent of undergraduates are women, and one in 10 is at least 25 years old. About 90 percent of Millersville's undergraduates come from southeastern Pennsylvania.

Millersville University is a selective institution, admitting 73 percent of the approximately 6,000 students who apply each year. Millersville students are well above national norms in SAT scores, high school grades and class rank, and in years spent studying college preparatory subjects such as English, mathematics, foreign languages, science and social studies. About half the freshman class has combined Verbal and Math SAT scores over 1000, and approximately 51 percent graduated in the top two-fifths of their high school class.

Over 2,200 students live in University residence halls, with the remainder of the student body commuting from homes and nearby apartments.



ADMISSIONS & FINANCES

Millersville University

MILLERSVILLE UNIVERSITY 2016 - 2017

ADMISSION TO MILLERSVILLE UNIVERSITY

Students may be admitted to Millersville University to work toward an undergraduate degree or to take college-level courses for self-enrichment or career development. Students already holding a bachelor's degree may wish to pursue a second undergraduate degree. For more information on any of Millersville's undergraduate admission programs, contact the Office of Admissions in Lyle Hall at 800-MU-ADMIT or 717-871-4625, or visit the Millersville website at www.millersville.edu.

GENERAL ADMISSION POLICIES FOR ALL APPLICANTS TO UNDERGRADUATE DEGREE PROGRAMS

QUALIFYING FOR ADMISSION

To be considered for admission to Millersville University, one must be a graduate of an approved secondary school or hold a General Educational Development (GED) high school equivalency diploma. Traditional students applying directly from high school must have completed a college preparatory curriculum. Generally, the student's academic program should include four units of academic English; three units or more of academic mathematics, minimally including algebra I, algebra II and geometry; three units or more of academic science, including two or more units of laboratory science, biology and chemistry with lab and any other inquiry-based lab or technical science; and three or more units of academic social science coursework. Foreign language coursework at the secondary level is recommended but not required for admission consideration. Also required are satisfactory scores on the SAT or ACT. Any home-schooled applicant wishing to be considered for admission to Millersville University should be a graduate of an approved home school association program. A GED issued by the Pennsylvania Department of Education is preferred if the student has not completed an approved program of study. Also required are satisfactory scores on the SAT or ACT.

Admission to undergraduate degree programs at Millersville is selective. However, a special admission program is available for some whose high school record or SAT or ACT scores do not demonstrate their true potential.

Admission to Millersville University is granted without regard to race, color, religion, sex, national origin, ancestry, age, handicap, marital status or lifestyle. Applications from qualified out-of-state students are welcomed; requirements for Pennsylvania resident status appear under the *Expenses and Financial Aid* section of this catalog.

All courses are taught in English, and students are expected to have demonstrated English language proficiency.

HOW TO APPLY

Prospective students are encouraged to apply electronically by following the undergraduate application instructions on the Millersville University website at www.millersville.edu. If you wish to receive a paper application form, please contact the admissions office. For an application file to be considered complete, the following must also be submitted:

1. An official copy of the secondary school record.
2. An official copy of SAT or ACT scores. Arrangements for taking either of these tests may be made through the student's high school guidance office or by contacting the appropriate test organization. Since these scores are used for determining University scholarship eligibility, students may wish to retake them if there is reason to expect a significant score increase.
3. An application fee of \$40 for the electronic application or \$50 for the paper application.

Although not required, applicants are encouraged to submit two letters of recommendation from their principal, counselor or teachers, which should be sent directly from the school to the admissions office.

DEADLINES FOR APPLICATIONS

Millersville has a rolling admissions policy and usually notifies applicants of a decision within a month after completed forms and supporting credentials are received. High school students are encouraged to submit applications as early in their senior year as possible. Applicants may apply for admission to begin coursework in the fall, spring or summer semester. Those applying too late for the admission date of their preference will have their application considered for the next available admission date.

ACCEPTING AN OFFER OF ADMISSION

Applicants admitted to the fall semester at Millersville must pay a nonrefundable advance matriculation deposit no later than May 1, or 15 days after the date of the admission letter, whichever is later. Students admitted to University residence halls must also pay an advance housing deposit. These deposits are explained in the *Expenses and Financial Aid* section of this catalog.

Students must enroll in the semester for which they are admitted. Students who do not enroll must submit a written request for the deposit to be applied to the next semester. This request must be submitted prior to the first day of classes in the term for which admission was offered. Failure to enroll and/or submit the written request will result in withdrawal of the admission offer and forfeiture of the deposit.

PART-TIME STUDENTS

Full- and part-time degree-seeking applicants must meet the same admission requirements.

SPECIAL ADMISSIONS PROGRAMS FOR DEGREE-SEEKING APPLICANTS

THE MILLERSVILLE SCHOLARS PROGRAM

The Millersville Scholars Program provides support services which promote student success, retention and graduation from Millersville University. It is for students who may not otherwise have access to college and assists these students in building the skills, habits and aptitudes that determine success. The Millersville Scholars Program includes an intensive bridge program just prior to the start of the first year, known as the Pre-Scholars Summer Institute (PSSI). Students receive comprehensive counseling and advising support their first year that includes a living/learning community during the first semester.

TRANSFER APPLICANTS

Students who have completed a minimum of 12 transferable credits of coursework at another regionally accredited institution or an approved military training experience with an overall academic average of 2.0 or higher may be considered for admission as a transfer student. Applicants must submit an official college transcript from each institution previously attended. Transfer applicants with fewer than 12 transferable credits must also submit a high school transcript and standardized test scores (SAT or ACT).

A higher GPA and more transferable credits are required to enter some majors.

Applicants with less than a 2.0 average may be admitted on probation if they have been out of college for at least one semester and meet freshman admissions criteria.

Pennsylvania's State System of Higher Education (PASSHE) Academic Passport. Millersville participates in the PASSHE Academic Passport program, which applies to students who transfer from Pennsylvania community colleges and other PASSHE institutions. Under Passport guidelines, students who have earned at least 12 transferable credits with a minimum 2.0 GPA (on a 4.0 scale) from another participating institution will be considered Passport students. A higher GPA will be required to enter some majors. Millersville will make every attempt to transfer previous coursework into required general education or major program course requirements. Some courses may transfer as electives. Courses in which a grade of D was received at a participating passport institution may be transferable, with the exception of English composition and public speaking.

Statewide Program-to-Program (P2P) Articulation. Millersville University participates in the Statewide Program-to-Program (P2P) Articulation agreement, which allows students who graduate with specific associate degrees from Pennsylvania community colleges to transfer into a parallel baccalaureate degree program at a participating 4-year institution with junior standing. These agreements are based on the successful completion of an Associate of Science (AS) or Associate of Arts (AA) degree that includes at least 60 college-level credits and incorporates the required competencies as described in the TAOC (Transfer Articulation Oversight Committee)—approved documentation which can be found at www.PAcollegetransfer.com.

Harrisburg Area Community College (HACC)/Reading Area Community College (RACC) and Millersville University Dual Admissions Programs. These are dual advisement programs designed to assist students who begin their studies at the community college and earn an associate degree prior to transferring to Millersville University. Students apply to the dual admissions program through their community college. The Millersville University Admissions Office receives the student's community college transcript at the completion of each semester. A credit evaluation is provided, and credits are entered into the student's Millersville University academic record. Students participating in the dual admissions programs are allowed access to a degree audit report to see how their community college credits apply towards a Millersville University degree. Early in their final semester at HACC or RACC (prior to earning an associate degree), Millersville will formally admit participants to the University for the semester specified by the student when they entered the program. With special permission from both the community college and Millersville, students may enroll in a limited number of Millersville University courses while pursuing their AA or AS degree.

Transfer Credit. Evaluation of credits from other institutions for possible transfer to Millersville is done by the admissions office after a student has applied and official college transcripts have been received. A preliminary credit evaluation is included with the admission letter sent to most students. In general, transfer credit is awarded for college-level courses in fields of study offered at Millersville that were completed with a grade of C- or higher through a regionally accredited institution. For institutions with other grading scales, courses in which the applicant has earned a grade above the lowest passing grade are accepted.

Transfer students who hold an associate degree from a Pennsylvania community college receive full credit for all work successfully completed, except for remedial or developmental courses and Millersville competency requirements (English composition and public speaking) in which a grade of at least a C- is not earned. To earn a Millersville degree, transfer students are required to complete a minimum of 30 semester hours through Millersville, including 50 percent of their major department requirements (excluding student teaching).

Students who have been awarded transfer credit for a particular course, and subsequently complete the same course at Millersville, forfeit the transfer credit.

Transfer credits are not used in computing Millersville GPAs.

INTERNATIONAL STUDENTS

Students from other countries, or for whom English is a second language, may be admitted to a degree program if, in addition to satisfying general admissions requirements, they demonstrate proficiency in English. Proficiency may be shown by earning a score of 550 or higher on the written Test of English as a Foreign Language (TOEFL), or a score of 213 or higher on the computer-based TOEFL, or a score of 70 on the Internet-based test. The TOEFL is administered internationally. In lieu of the TOEFL, English language proficiency may be demonstrated by earning a score of "6" or higher on the International English Language Testing System (IELTS) exam.

Students from English-speaking countries may choose to take the SAT or ACT as an option to the TOEFL or IELTS exam. Foreign student athletes who intend to compete in intercollegiate sports must take the SAT or ACT, even if they have taken the TOEFL or IELTS exam.

In addition to demonstrating English language proficiency, as noted previously, transfer students with academic credentials from outside of the United States must have their college/university credentials and/or mark sheets sent to a recognized credential evaluation service for evaluation, as well as to the Millersville University admissions office. Original or certified copies of academic credentials must also be sent directly to the Millersville University admissions office. Two such credential evaluation services are the World Education Services, Inc., at www.WES.org or the American Association of Collegiate Registrars and Admissions Officers (AACRAO) at www.AACRAO.org. The credential evaluation service should mail the evaluation report directly to the Office of Admissions, Millersville University, P.O. Box 1002, Millersville, PA 17551-0302, USA.

EARLY ADMISSION

Exceptional high school students may apply for early admission at the end of their junior year. Admissions criteria include pursuit of a rigorous college preparatory curriculum, superior high school class rank, GPA and SAT or ACT scores, and a recommendation letter.

NURSING MAJORS

The Bachelor of Science in Nursing (BSN) degree program is designed for registered nurses who are graduates of accredited diploma or associate degree nursing programs. Admission requirements to Millersville's nursing program are:

1. Evidence of scholarship as shown by an official transcript from an ACEN-accredited diploma school of nursing or an ACEN-accredited associate degree in nursing program.
2. Possession of a Pennsylvania license as a registered nurse. RN candidates for licensure will be admitted pending successful completion of state licensure requirements.

The Dual Admission in Nursing Program, in conjunction with Harrisburg Area Community College, provides the opportunity for the student to apply for dual admission to the University as well as the community college. This dual admission enhances student learning by providing access to an array of academic services in support of attaining the bachelor's degree in nursing. Formal admission to the major in nursing at Millersville University occurs upon graduation from Harrisburg Area Community College.

ART & DESIGN MAJORS

Applicants for the B.F.A. in art, B.A. in art or the B.S.Ed. in art education programs, including transfer applicants, must submit an art portfolio. No original work will be accepted. The portfolio should include a variety of the student's best work. Ten to 15 pieces will be requested in total, with at least two drawings from direct observation. There will be no in-person reviews. Portfolio review deadlines are the first Friday of the month, from September through May.

MUSIC MAJORS

Applicants for the B.A. in Music Business Technology, the B.A. in Music and the B.S.Ed. in Music Education, including transfer applicants and certification students, are required to audition with a solo performance and to take a musical proficiency test. Information about the audition procedure and dates may be obtained from the music department website or by calling 717-871-4700 or 717-871-4701.

ATHLETIC TRAINING/BIOLOGY DUAL DEGREE

Millersville University, in conjunction with West Chester University, offers two dual-degree programs. One is a B.S. in Biology: Pre-athletic Training option/Athletic Training dual degree, and the other a B.S. in Allied Health Technologies (B.S. ALHT): Pre-athletic Training option/Athletic Training dual degree. The pre-athletic training degrees are conferred by Millersville in Biology or Allied Health Technologies, while a second athletic training bachelor's degree is earned through West Chester University (B.S. in Athletic Training). The program requires 148 semester hours of study.

Interested students should apply to Millersville University as biology majors with the pre-athletic training option. Upon admission to Millersville, qualified students will be invited to interview for admittance into the dual-degree program. An interview is required for any student interested in athletic training, whether here or at West Chester University. Students not admitted to the dual-degree program will be required to select a new major or new biology option. Minimum requirements to qualify for an interview include a combined (critical reading and mathematics) SAT score of 1070 and/or class rank in the top 20 percent of the high school class; high school laboratory coursework in science (biology, chemistry and/or physics); and advanced mathematics. Although not required, experience in high school athletics as a participant or an athletic trainer aide is preferred. Letters of recommendation from certified athletic trainers, physicians, coaches or teachers may be submitted but are not required. Information regarding West Chester University course registration will be provided to students admitted into the program. For more information, please refer to the B.S., Biology: Pre-Athletic Training option description in the *Wellness & Sport Sciences* section of the catalog. You may also consult the B.S., Biology: Pre-Athletic Training and B.S., Allied Health Technologies: Pre-Athletic Training descriptions in the *Biology* section of the catalog.

READMISSION OF FORMER STUDENTS

Former students in good academic standing at the time of their official withdrawal may apply for readmission at any time. Those who were dismissed for academic reasons must interrupt their enrollment for at least one semester. (Refer to the *Academic Standards* section.) Those who subsequently attended another institution must have an official transcript forwarded by that institution to the Millersville University admissions office.

Re-entering students are subject to the curriculum and graduation requirements in effect at the time of their readmission, with the exception of those students who re-enter within one year of their official withdrawal or dismissal. These students have the option of continuing under the curriculum and graduation requirements in effect for them at the time of their withdrawal or dismissal.

OTHER RESTRICTED PROGRAMS

Millersville occasionally places more stringent admissions requirements on certain degree programs. Students interested in certain programs may be admitted to the University but denied admission to a specific program. Once studies at Millersville are successfully under way, students may formally request to transfer into other majors if they meet minimum departmental standards and if space is available.

ACADEMIC AMNESTY

Former Millersville University students applying for readmission following a minimum absence of five years since the end of their last semester are eligible to petition for academic amnesty if their cumulative grade point average (CGPA) was below 2.0 at departure. The petition must be in the form of a letter of appeal to the Academic Standards Committee, sent in care of the registrar's office.

In order to be eligible to petition for academic amnesty, the former student must complete an application for readmission to undergraduate degree status. If academic amnesty is granted, the calculation of the CGPA is restarted with the new matriculation semester.

Under academic amnesty, all previous coursework and grades remain on the permanent record but are not included in the calculation of the Millersville University CGPA after amnesty is granted. Students may use courses taken in the pre-amnesty period to fulfill general education requirements if a grade of C- or higher was earned in the course.

SECOND BACCALAUREATE DEGREE STUDENTS

Anyone with a bachelor's degree from a regionally accredited college or university may apply to earn a second bachelor's degree. All second-degree students must declare a major at the time they apply for admission.

NONDEGREE STUDENTS APPLYING FOR DEGREE-SEEKING STATUS

Individuals who are high school graduates or hold a General Education Development (GED) certificate may choose this alternative entry into a degree program without taking the SAT or ACT tests. These students should first apply to the University as nondegree students. Upon completing 12 credits in at least two subject areas with an average of 2.0 or higher, they may then apply for degree-seeking status.

ADULT AND NONTRADITIONAL STUDENTS

Millersville University serves individuals who wish to pursue academic interests while also fulfilling work and/or family responsibilities. These courses and programs enable students to reach educational goals by attending college on a full-time or part-time basis through evening, day, off-campus, online and weekend classes.

Applicants who meet criteria for regular admission will be admitted with the same full privileges as degree students. Applicants who do not meet established admissions criteria may pursue a college degree on a part-time basis with provisional degree status. Provisional status ends when students successfully complete 12 credits at Millersville with a 2.0 average. Students who recently were asked to leave a college due to poor academic performance may not be admitted to these programs. New students may begin the admission process in the spring, fall or summer semester. Application forms are submitted online to the Millersville University Office of Admissions with a one-time application fee of \$40.

Provisional admission opportunities also exist for the adult who did not have strong academic interests in high school or who tried college but did not continue due to motivational or personal reasons. The only required admission credential is a diploma and official transcript from an approved secondary school, a Commonwealth Secondary School Diploma or a General Education Development (GED) certificate. Official college transcripts are required from all colleges previously attended.

Students who are granted admission will be assigned an academic advisor in their major field. Those admitted provisionally or who do not meet departmental admission requirements will be listed as undeclared and temporarily assigned an undeclared advisor. Adult students are urged to meet with advisors well before the beginning of the semester to determine course selections. For additional information on off-campus, evening, weekend and online offerings and programs, contact the CGSAL at profdev@millersville.edu, or at 717-871-4723.

SPECIAL ADMISSION STUDENTS

POST-BACCALAUREATE TEACHING CERTIFICATION STUDENTS

Anyone with a bachelor's degree may apply for courses leading to initial or additional teaching certification as a full-time or part-time student. For teaching certification requirements, contact the certification office, Stayer Hall, Room 120. To apply for admission, contact the CGSAL, Lyle Hall, Room 241.

PASSHE VISITING STUDENTS

The purpose of the PASSHE Visiting Student program is to facilitate undergraduate student enrollment at institutions of Pennsylvania's State System of Higher Education and to enable students to take advantage of courses available across the System, without loss of institutional residency, eligibility of honors or athletics, or credits toward graduation at the home institution.

See the *Special Academic Opportunities* section of this catalog.

TRANSIENT STUDENTS FROM OTHER COLLEGES

Students in good academic standing who are on leave from a degree program at another college may apply to Millersville as part-time transient students.

STUDENTS FROM FRANKLIN & MARSHALL COLLEGE AND LANCASTER THEOLOGICAL SEMINARY

Millersville University has reciprocal agreements with these two institutions. Franklin & Marshall College may, upon appropriate authorization, send students to Millersville for courses not offered at Franklin & Marshall, without a tuition charge from Millersville. Similarly authorized full-time graduate students from Lancaster Theological Seminary may enroll in undergraduate and graduate-level courses at Millersville without a tuition charge by Millersville.

Millersville students may also take advantage of these agreements and enroll for courses at these institutions. See the *Special Academic Opportunities* section for more information.

HIGH SCHOOL STUDENTS (DUAL ENROLLMENT)

Qualified high school juniors and seniors may take credit-bearing courses at Millersville while pursuing their high school diplomas. Applicants must submit an official high school transcript and SAT, ACT, PSAT or PLAN testing results. They must also complete a special high school student application form and a special high school student enrollment permission form. Both forms can be obtained from your high school counselor or from the Millersville Admissions Office. Participation in the program does not guarantee later admission as a degree-seeking student. Home-schooled students pursuing a Pennsylvania Homeschoolers Association Diploma or other regionally recognized home schooling certifying program are also encouraged to apply, submitting officially certified transcripts and standardized test results.

VETERANS

Millersville University meets all criteria for approval of Veterans Education under the provisions of Title 38, United States Code, Section 1775 (a)(1). DANTES and USAFI courses are considered for transfer credit in accordance with the recommendations of the Commission of Accreditation for Service Experiences of the American Council on Education.

Veterans, reservists, VA vocational rehabilitation participants and eligible dependents should contact the Veterans Resource Center at 717-871-4343 for information on educational benefits and support resources.

AUDITING COURSES

An individual who is not concerned with earning credit may audit a course upon approval of the course's instructor. An auditing student attends classes and participates in class discussions but does not take examinations, write papers or fulfill other requirements generally associated with earning credit. The student's transcript does not record a grade but notes that the course was audited. Standard tuition and fees are charged. Ordinarily no more than one course may be audited per semester.

Students enrolled in a degree program may also request audit privileges. See the *Special Academic Opportunities* section of this catalog.

CONTINUING EDUCATION

Continuing education students experience the best of Millersville University one class at a time. Choose from hundreds of undergraduate and graduate courses which can be taken as not-for-credit. Enjoy vibrant discourse with your fellow classmates and the guidance of the University's renowned faculty. Many classes meet online or at night. Enrollment is limited to space available after the drop/add period for matriculated (degree-seeking) students. For more information on how to enroll for noncredit as a nondegree student, contact the CGSAL, Lyle Hall, 717-871-4723.

ADVANCED STANDING

ADVANCED PLACEMENT EXAMINATIONS (AP)

Credit is granted to students earning scores of 3 or higher on AP examinations. The number of credits awarded depends on the academic major, AP subject area and departmental recommendation. Contact your high school guidance office for information on taking an AP examination. Students must be admitted to degree status and be currently enrolled to be eligible for an AP credit award. A score report from the College Board must be sent to Millersville University. Visit www.millersville.edu/registrar for more information regarding score reports.

COLLEGE-LEVEL EXAMINATION PROGRAM (CLEP)

CLEP is a program of the College Board that includes both general and subject examinations. Six credits are awarded for scores of 50 or above on each of the CLEP general examinations: English Composition (with or without essay); Humanities; College Mathematics; Natural Sciences; and Social Sciences and History. Credit is not granted for the CLEP general examinations taken after 15 college credits have been earned, or in discipline areas where college-level coursework has been taken, whether the course was passed or not.

Three to six credits are awarded to students who earn a score of 50 or above on the CLEP subject examinations. Currently enrolled Millersville students must obtain written permission from the department chair where the content of the subject examination is taught at Millersville prior to taking a subject examination.

Contact the University Test Center, Stayer Hall, at 717-871-4168 or test.center@millersville.edu for information on taking a CLEP examination. Contact the registrar's office at www.millersville.edu/registrar regarding credit awards.

CHALLENGING COURSES BY EXAMINATION

Students who feel they have already mastered the material in a Millersville course may “challenge the course by examination,” taking a test on the course content instead of enrolling for the course itself. Students may challenge most courses in which they have not received a grade, and which have not been waived because of demonstrated competency or advanced placement. Because of content and structure, some courses may not be challenged by examination.

Contact the registrar's office, Lyle Hall, for instructions, fee information and approval forms. The examination is given at the convenience of the instructor. The grade earned is entered on the student's record and calculated into the GPA whether or not a passing grade is earned.

In some instances, department chairpersons may approve the use of a CLEP subject examination to challenge a course by examination. See the preceding section on CLEP for more information.

INTERNATIONAL BACCALAUREATE (IB) PROGRAM

Millersville University recognizes the value of the rigorous IB Program and gives it serious consideration when evaluating the credentials of applicants. For students entering with the IB Diploma or Certificate, credit may be awarded for a score of five or higher on examinations in higher-level (HL) IB courses. Such credit is generally awarded on a course-by-course basis as recommended by the appropriate Millersville University department. The University does not give credit for standard-level (SL) examinations.

Credit awarded for IB higher-level examinations may be used to satisfy general education requirements, major or minor requirements, or electives in the same manner as Advanced Placement (AP). Students will not receive duplicate credit for IB examinations, AP examinations, CLEP examinations or any other college courses taken before or after enrolling at Millersville University. In the event of overlapping course content, credit will be given for only one course.

International Baccalaureate transcripts should be submitted to the Office of Admissions, Millersville University, P.O. Box 1002, Millersville, PA 17551-0302. Students can request transcripts through their high school IB coordinator within the first year after high school graduation. Thereafter, transcripts can be requested from the International Baccalaureate Program, North America, 475 Riverside Drive, 16th Floor, New York, NY 10115, 212-696-4464, ibna@ibo.org.

EXPENSES AND FINANCIAL AID

As a state-owned university, Millersville University provides educational opportunities that surpass those available at many more costly institutions.

The table below and other information in this section present the most recent approved costs for the academic year (September to May) for students living in University residence halls. Tuition and fees are subject to change at any time.

	Residents of Pennsylvania	Nonresidents of Pennsylvania
Tuition*	\$8,460	\$17,650
General Fee*	\$2,022	\$2,022
Technology Fee*	\$436	\$664
Room & Meals**	\$13,484	\$13,484
Estimated Books & Supplies***	\$1,000	\$1,000
Estimated Personal Expenses***	\$1,676	\$1,660
Estimated Travel Costs***	\$800	\$800

*Costs are based on 2015-2016 rates and are subject to change each academic year.

**Costs are based on an average of all available housing and meal plan options.

***Costs not billed directly by the University, but that a student may incur.

PAYMENT OF TUITION AND FEES

Students enrolling for classes during the early registration period are not required to pay immediately. Electronic semester bills are forwarded four to six weeks before the beginning of each semester. Full payment is due two to three weeks prior to the beginning of the semester.

Student account balances by term are available on the Millersville website through our MyVille. Students enrolling after billing are requested to make payment immediately upon registration. Students are considered officially enrolled, able to earn credits, receive grades and graduate when all fees are paid in full or their account is "clear." Students who register are responsible to drop any class they do not plan to attend. Failure to drop the class before the semester begins may result in charges and/or grades being posted to your records. Do not rely on the "drop for nonpayment" policy to remove classes.

Information about fees, payments and receipts can be found at www.millersville.edu/osa or at the Office of the Bursar, Dilworth Building. Credit card payments can be made using MyVille online.

Payment Plan

Millersville University has partnered with Tuition Management Services (TMS) to offer an optional installment payment plan to help students and parents meet education costs for the fall and spring semesters.

The TMS payment plan enables participants to make regularly scheduled monthly payments. The payment plan allows for all or a portion of University costs to be paid in five monthly payments per term without interest.

To join this convenient payment plan today, contact TMS at 1-800-343-0911 with questions, or log onto millersville.afford.com and select Millersville University to enroll.

TUITION

Tuition charges are set in July by the Board of Governors of Pennsylvania's State System of Higher Education.

Tuition for Residents of Pennsylvania. In-state undergraduates pay \$282 per credit hour. All undergraduates pay \$282 per credit hour during winter and summer sessions.

Tuition for Nonresidents of Pennsylvania. Full-time undergraduates pay \$8,825* per semester for 12 to 18 credit hours plus \$735* per credit hour over 18. Part-time undergraduates enrolled for fewer than 12 credit hours pay \$735* per credit hour. All undergraduates pay \$735* per credit hour during winter and summer sessions.

*2015-2016 rates. Rates will change. For up-to-date fee information, please refer to the Bursar's Office website at millersville.edu/bursar.

Tuition for International Students. International students are charged nonresident tuition and fees.

Residency Status. In order to qualify for Pennsylvania resident tuition, students must meet State System of Higher Education criteria as summarized below:

1. Continuous residence in Pennsylvania for 12 months prior to registration.
2. U.S. citizenship, formal declaration of intent to become a citizen, or admission to the United States on an immigrant visa. A nonimmigrant visa (tourist or student visa) is not proof of intent of residency.
3. Pennsylvania residency by parent(s) or guardian(s) of students who are minors. The age of majority in Pennsylvania for establishing an independent residence for tuition purposes is 22. A minor may, however, prove financial emancipation and independence through clear and convincing evidence.

4. A United States government employee or a member of the armed forces who was residing in Pennsylvania immediately prior to entering the government service and who has continuously maintained Pennsylvania as his or her legal residence is considered a Pennsylvania resident. Others in military service stationed in Pennsylvania are considered Pennsylvania residents.
5. A student receiving a scholarship or grant dependent on residence in a state other than Pennsylvania is not considered a Pennsylvania resident.

A student who changes his or her residence from Pennsylvania to another state must give prompt written notice to the University. The University may reclassify a student if it believes he or she is no longer a Pennsylvania resident. Students may challenge residency classifications by making written petitions to the Bursar's Office, Dilworth Building. To obtain the request form, go to the bursar's homepage at www.millersville.edu/osa and click on "Residency."

Refunds will be made according to current University and State System of Higher Education policies. Students who reduce their credit-hour load after the end of the drop/add period so as to qualify for billing as part-time students shall not be eligible for a refund of the amount billed which exceeds the part-time rate. After the drop/add period, refunds shall be made only for full-semester withdrawal.

After the end of the drop/add period, there will be no partial refunds for full-time students who reduce their credit-hour load below full-time status, or for part-time students who reduce their credit load. After the drop/add period, refunds of tuition and the general fee will only be made for students who officially withdraw from the University or, in the case of eligible undergraduates, take an official leave of absence.

The technology fee is nonrefundable after the drop/add period, and the refund of tuition and general fee for total withdrawal will be based on the following schedule for the fall and spring semesters.

Through "drop/add period"	100%
Second week.....	80%
Third week.....	60%
Fourth week.....	50%
Fifth week.....	40%
After fifth week	No refund

NOTE: Refunds for first-time students receiving financial aid under Title IV are made according to Public Law 102-135, Section 484B of the Higher Education Amendments.

First summer session, second summer session, third summer session and winter session are each considered to be separate terms and are treated as such for refund purposes. See the appropriate session course listing for the applicable refund schedule on the University website, www.millersville.edu/osa. Rates and refund amounts are subject to change.

GENERAL FEE

The General Fee is a mandatory fee used to support a variety of ongoing student services and activities, such as student senate, student organizations, health services and wellness programs, Student Memorial Center debt service, expansion, capital replacement and maintenance.

The fee is charged to all students (full-time and part-time, residential and commuting/off-campus) during all University sessions (including first summer session, second summer session, third summer session and winter session) and at all course locations (including University Center in Harrisburg and other off-campus sites).

The 2015-2016* fee was \$1,011 per semester for full-time undergraduate students and \$84.25 per credit hour for part-time undergraduate students.

*Rates subject to change for 2016-2017.

TECHNOLOGY FEE

The technology fee is a mandatory fee collected to support instructional technology.

The 2015-2016* fee was \$218 per semester for full-time Pennsylvania residents, and \$332 per semester for full-time nonresidents. Part-time Pennsylvania residents pay \$19 per credit, and part-time nonresidents pay \$28 per credit.

Refunds. The policies and schedule for tuition refunds also apply to the General Fee.

*Rates subject to change for 2016-2017.

STEM FEE

A STEM fee is charged to all students who have earned at least 30 credits and who have declared a STEM major (Science/Technology/Engineering/Math). The fee is \$8 per credit for a maximum of \$96 per semester.

HOUSING AND MEAL PLAN FEES

The 2016-2017 housing and meals rate is \$6,742 per semester with a 19-meal plan. ALL residential students (freshmen, transfers and upperclassmen) are automatically enrolled in the 19-meal plan. Meal plans are the total number of meals a student has each week, and flex is additional dollars that can be used at dining facilities each semester. Any remaining flex from the fall semester rolls over to the spring semester. Residential students may change their plan to a 14-meal week, 255-meal (semester), 210-meal (semester) or 180-meal (semester) plan, but no later than the Friday prior to the first day of classes. The housing and meal rate for students living on campus during a five-week summer session is \$1,297, including a 60-meal plan for \$572 with \$50 of flex.

Adjustments in Meal Plan Fees. Student teachers and cooperative education students residing in University-operated residence halls may request a meal plan adjustment until the Friday prior to the beginning of the semester. No reduction in rate will be made for students who go home for a few days at a time.

Meal Plan for Students Living Off Campus. Students living off campus are welcome to dine in University dining rooms and retail locations. Off-campus students may sign up for a meal plan at any time. Changes may be made no later than the Friday prior to the first day of classes.

Meal plan per semester:

Traditional Meal Plans			
Meal Plan <i>(per week)</i>	Flex <i>(per semester)</i>	Guest Meals <i>(per semester)</i>	Cost of Plan <i>(per semester)</i>
19-meal	\$150	2	\$2,450
14-meal	\$150	2	\$1,920
Block Meal Plans			
Meal Plan <i>(per semester)</i>	Flex <i>(per semester)</i>	Guest Meals <i>(per semester)</i>	Cost of Plan <i>(per semester)</i>
255 meals	\$150	2	\$2,369
210 meals	\$150	2	\$1,977
180 meals	\$150	2	\$1,716
90 meals	\$150	2	\$933
60 meals	\$150	2	\$672
45 meals	\$150	2	\$542

Note: Price per meal for all block plans did not change for 2016-17. New for 2016-2017: For all block plans, students will have the option to purchase the amount of flex dollars they desire with a minimum of \$150 and a maximum of \$400 (in multiples of \$50). Flex dollars will roll forward from fall to spring.

*Note: Flex dollars roll forward from fall to spring. Any flex dollars left over at the end of the spring semester are forfeited.
Flex dollars may be purchased in increments of \$50 for use in any dining location.

The 2017 summer meal plan charge for a five-week summer session:

\$833	90 meals
\$572	60 meals
\$442	45 meals

Visitors and students who live off campus are also welcome to dine in University dining on an occasional basis. Breakfast costs \$7.25*; lunch, 10.50*; dinner, \$14.25*; and brunch, \$10.50.* Rates for special events are available through Dining and Conference Services at Gordinier Hall. *Rates are subject to change.

All students who leave the University, regardless of reason, receive a prorated refund of meal plan fees, provided they complete the official withdrawal process.

Refunds. A prorated refund schedule for housing and meal plan fees for students who withdraw from the University is as follows:

Before student move-in day	100%
First week	90%
Second week	80%
Third week	70%
Fourth week	60%
Fifth week	50%
After fifth week	No refund

Marauder Gold. Money deposited into your Marauder Gold account may be used to make purchases at on-campus locations, University services and local participating vendors that display the Marauder Gold logo, including the University Store. You can open a Marauder Gold plan with a minimum deposit of \$50 and additions of \$25. Please notate Marauder Gold and the amount being sent on your statement.

Marauder Gold must be paid by check, money order or credit card. Financial aid may not be used.

OTHER FEES

Application Fee: Undergraduate Admissions. Students who apply and are admitted to the University through the admissions office and are seeking an undergraduate degree will pay the undergraduate application fee of \$40 for an electronic submission, or \$50 for a paper submission, only once. This is a nonrefundable application fee. After the application fee is paid the first time, any subsequent reapplication will not require payment of a second application fee.

No application fee will be required for transient and nondegree admission using the Part-time Nondegree Application (blue form).

Application Fee: Graduate Admissions. People who apply for admission through graduate and professional studies, regardless of the type of admission they seek (e.g., master's degree, certification, nondegree), will pay a graduate application processing fee of \$40 with the submission of each new application.

Late Payment Fee. Students who do not return the billing statement or make full settlement of their account by the due date are charged \$25.

Late Registration Fee. Students who register after the start of the semester/session are charged \$25, except when permission for late registration has been granted by the registrar.

Orientation Fee. Students admitted for the fall semester are required to pay an orientation fee and are expected to attend the orientation program offered in August. The orientation fee amount varies annually and is required regardless of attendance.

Special Handling Fee. Anyone who gives the University a check or credit card that is not honored by the bank on which it is drawn is charged \$35.

Replacement Fee. The fee for replacement of a Millersville student identification card is \$25.

Damage Fee. Students are responsible for damages, breakages, and loss or delayed return of University property.

Degree Fee. Each candidate for a degree must pay \$30 to cover the cost of the diploma. The Commonwealth of Pennsylvania requires a nonrefundable fee for credentials evaluations and processing teaching certification applications.

Health Services Supplies Fee. The cost of any expensive supplies used to treat a patient at Health Services will be charged to the patient.

Library Overdue and Items Fees. Please contact the library for information at 717-872-3612, or visit the Millersville website, www.millersville.edu.

DEPOSITS

Advance Matriculation Deposit. A nonrefundable \$150 deposit is required upon acceptance of the offer of admission. It is applied toward payment of tuition. It is transferable on a one-time basis to a revised admission date upon the approval of the director of admissions.

Advance Housing Deposit. Students admitted to University residence halls must pay a deposit of \$200 each year. It may be applied only toward payment of residence hall fees for spring. It is transferable on a one-time basis to a revised admission date upon the approval of the director of admissions. It is fully refundable only for medical reasons certified in writing by the attending physician or for compulsory military service certified in writing by military authorities. A partial refund (\$50) of the deposit is made if written notification is received by the admissions office no later than May 15. A partial refund (\$25) of the deposit is made if written notification is received by the admissions office or the office of Housing & Residential Programs no later than July 1.

OTHER EXPENSES

Most students incur additional expenses for books and supplies, personal needs, and traveling to and from home. These are not charged directly by the University; however, the University provides estimates for the purpose of assisting the students in finding aid resources to meet the needs of their additional expenses.

The total annual expense for Pennsylvania residents living oncampus in the residence halls is estimated at \$26,189; and \$35,591 for nonresidents for the 2015-2016 academic year.

The total annual expense for commuting students living at home with their parents/guardians is estimated at \$19,240; and \$28,642 for nonresidents for the 2015-2016 academic year.

The total annual expense for off-campus students who are renting temporary housing in the Millersville/Lancaster area is estimated at \$19,240; and \$28,642 for nonresidents for the 2015-2016 academic year. *This amount assumes the student is sharing facilities and rental costs with at least one other person.*

More information regarding estimated expenses can be found on the Financial Aid section of Millersville's website under *Calculating Eligibility*: www.millersville.edu/finaid.

Student Insurance. An accident and sickness insurance plan is available to Millersville University students through the University insurance carrier, Consolidated Health Plan. All questions regarding eligibility, insurance coverage, costs or premium refunds should be directed to the insurance carrier, 800-633-7867.

FINANCIAL AID

Financial aid resources are available to *eligible* students attending Millersville; these resources can include scholarships, state grants, federal grants, employment programs, federal loans and private education loans. To be considered for state and federal aid resources, students must complete the Free Application for Federal Student Aid (FAFSA) each year. To be considered for all types of aid, the recommended deadline to complete the FAFSA is March 15. To be considered for a state grant, the FAFSA *must* be filed prior to May 1.

More information regarding eligibility and how to complete the FAFSA can be found on the Financial Aid section of Millersville's website: www.millersville.edu/finaid.

UNIVERSITY SCHOLARSHIPS

A number of scholarships are offered at Millersville, including scholarships based on academic performance, athletic potential and need. Information on University scholarships can be found in the following section of this catalog and on the Financial Aid section of Millersville's website under *Millersville University Scholarships* and *Admissions Scholarships*: www.millersville.edu/finaid.

FEDERAL GRANT PROGRAMS

Federal Pell Grants. Federal Pell Grants are federally funded awards based on the financial need of the family. To apply for a Federal Pell Grant, complete the Free Application for Federal Student Aid (FAFSA), available online at www.fafsa.ed.gov, after October 1. Within four weeks, the student will receive a Student Aid Report (SAR) via email (if an email address is provided). Eligibility of the Federal Pell Grant will be determined by the Office of Financial Aid, and you will be notified of your award amount (if any) in your financial award package.

Federal Supplemental Educational Opportunity Grant (FSEOG). This program is for undergraduate students of exceptional financial need. To be eligible, students must be eligible for a Federal Pell Grant and be enrolled at least half-time (6 credits). FSEOG grants at Millersville normally range from \$200 to \$800 per academic year.

STATE GRANT PROGRAMS

The Pennsylvania Higher Education Assistance Agency (PHEAA) provides state grants (PA State Grants) to help Pennsylvania residents in need of financial assistance to attend approved institutions of higher education. To apply for a PA State Grant, complete the Free Application for Federal Student Aid (FAFSA) by May 1. The FAFSA is available online at www.fafsa.ed.gov after October 1.

Grant award amounts depend on educational expenses, family size and resources. PA State Grants are subject to annual review and may change from year to year. Renewal depends on satisfactory academic standing, continued need for financial assistance and the availability of funds appropriated by the Pennsylvania General Assembly. Please visit www.millersville.edu/finaid for more information regarding the PA State Grant Program, or go to www.pheaa.org.

STUDENT EMPLOYMENT PROGRAMS

Federal Work-Study Program (FWS). This program provides funds to students who have completed a FAFSA application and who have financial need. Students may be eligible if they are enrolled at least half-time (6 credits). Federal Work Study wages are earned as hours are completed and do *not* pay towards the student's tuition bill.

Millersville University Student Employment Program. This program differs from federal work-study because students do not have to complete a FAFSA application or demonstrate financial need. Available jobs are posted online and at the Office of Career Services. Wages are earned as hours are completed and do *not* pay towards the student's tuition bill.

LOAN PROGRAMS

Federal Perkins Loans. This program is for students who complete the Free Application for Federal Student Aid (FAFSA), are enrolled at least half-time (6 credits) and demonstrate significant financial need. Maximum loans are \$3,000 per year. Repayment begins nine months after leaving school, with up to 10 years to repay. During the repayment period, 5% interest is charged on the unpaid balance of the principal loan amount.

Federal Direct Loans. This program enables students to borrow federal loans directly from the U.S. Department of Education. To be considered eligible, a student must complete the Free Application for Federal Student Aid (FAFSA) and be enrolled at least half-time (6 credits). Millersville University will confirm the student's borrowing eligibility for the period they are enrolled and originate a loan with the Department of Education.

The maximum loan for a dependent undergraduate student ranges from \$5,500 to \$7,500 per year and is based on the student's grade level (credits earned). Federal Direct Loans can be subsidized or unsubsidized. Subsidized loans are awarded on the basis of financial need, and the federal government pays the interest on the loan while the student is enrolled at least half-time (6 credits). Unsubsidized loans are not awarded on the basis of need. The student will be charged interest from the time disbursed until it is paid in full. Repayment generally begins six months after the student leaves school (graduates, withdraws, takes a leave of absence or ceases to be enrolled at least half-time).

First-time students/borrowers must complete *Entrance Counseling* and a *Master Promissory Note* (MPN) online at www.studentloans.gov. The student must have a FSA User ID and password to log into their account and complete these steps.

Federal Direct Parent PLUS Loans. Available to parents of dependent undergraduate students. Additional information can be found on the Financial Aid section of Millersville's website: www.millersville.edu/finaid.

Federal Direct Graduate PLUS Loans. Available to degree-seeking graduate students only. Additional information can be found on the Financial Aid section of Millersville's website: www.millersville.edu/finaid.

Private/Alternative Loans. Applications are available through private lenders, and the loan is in the student's name (the borrower). This loan usually will require a credible co-signer. Additional information can be found on the Financial Aid section of Millersville's website: www.millersville.edu/finaid.

Emergency Loans. Enrolled students may apply for emergency loans to assist with unexpected expenses that may arise. They are limited to \$350 and must be repaid within 30 days; these loans cannot be used to pay University charges. Applications and additional information can be obtained in the Office of Financial Aid.

ACADEMIC PROGRESS POLICY

This policy was became effective with the 2012-2013 academic year. The policy is cumulative and includes all students and all periods of enrollment, whether or not aid was received for that period.

This policy refers only to FEDERAL financial aid. Information on PA State Grant satisfactory academic progress is included below as well.

Satisfactory Academic Progress (SAP) is defined as earning at least 75 percent of all attempted credits. The progress percentage is determined by dividing the total credits earned by the total number of credits attempted. Since the total attempted credits include withdrawals and “F” grades, future aid may be affected. Only credits earned from a course in which the student was actually enrolled are counted in calculation of SAP. Advanced Placement credits, CLEP credits, and credits earned from challenge exams, proficiency exams or life experience are not used in calculating SAP.

Students who are ineligible to receive aid due to academic progress will be notified by mail at the conclusion of the spring semester, after grades have been posted. Students will have the opportunity to appeal the decision based on extraordinary circumstances, or he/she may make up credits without financial aid until the percentage is met.

GPA Requirement. Undergraduate students must also maintain a minimum, cumulative GPA of 2.0. Graduate students must also maintain a minimum, cumulative GPA of 3.0.

PA State Grant Academic Progress. For PA State Grant purposes, full-time students must successfully complete 24 new credits each year or 12 credits each semester. Part-time students must successfully complete at least 6 new credits each semester. Summer is considered to be a semester. Only credits earned from a course in which the student was actually enrolled are counted. Remedial credits taken during a term when not receiving a state grant may not be counted toward progress.

UNIVERSITY SCHOLARSHIPS AND AWARDS

A scholarship is a financial grant for a student's tuition. The grants are based on specific criteria such as financial need or a particular academic or athletic excellence. Recipients are chosen by the Millersville University president or her/his designee. All scholarships/awards listed are not renewable unless specifically indicated otherwise in the description.

The University Scholarships marked with an asterisk(*) are awarded to first-year incoming students. For more information regarding how to apply for freshman scholarships, contact the admissions office. For general information regarding other scholarships, contact the department found in the brackets [] at the end of the scholarship criteria.

SCHOLARSHIPS - ACADEMIC

Dr. Joseph J. Abromaitis Family Industry and Technology Department Scholar-Athlete Scholarship. Awarded to a full-time male or female student majoring in industry and technology who participates in an intercollegiate sport in the year the scholarship is awarded. The recipient must be full-time, maintain a 3.0 GPA and be a sophomore, junior or senior for renewal. [Applied Engineering, Safety & Technology]

African-American/Latino Alumni Scholarship. Awarded to African-American and Latino students who are full-time undergraduates. Recipients must have a minimum CGPA of 2.5 with 36 or more credits. A written essay and interview are required. [AA-LAS Committee]

All-Greek Council/Stefanie Wojcik Scholarship. Awarded to a student affiliated with an organization that is a member of the All-Greek Council. [Student Affairs]

American Association of University Women Scholarship. Awarded to a "nontraditional" female student from the Lancaster area who has completed 90 credits and is one year from completing her degree requirements. [Financial Aid]

American Dream Scholarship. Awarded to a student(s) of academic promise who is committed to community involvement and shows demonstrated financial need. The award is renewable for an additional six semesters (total of eight). [Financial Aid]

American Industrial Hygiene Association Scholarship. Awarded to a student majoring in occupational safety and environmental health or a related discipline, and who has demonstrated a proclivity toward industrial hygiene. Applicants must have completed 60 credits, including 12 in industrial hygiene, and have a GPA of at least 2.5. [Applied Engineering, Safety & Technology]

Eugene and Dora Androlunis Scholarship. Awarded to orphaned students or students who have financial need who are also residents of the community of Shenandoah, Pa., or its vicinity. [Financial Aid]

The Judge and Mrs. Anthony R. Appel Scholarship. Awarded to at least two music majors at Millersville University, with preference to students with demonstrated financial need. The recipients must audition with the music department. The scholarship is renewable, provided the students continue to major in music and remain in good academic standing. The students may receive the scholarship for a total of eight semesters. [Music]

APSCUF-MU Scholarship. Awarded to two undergraduates enrolled part-time or full-time in a degree program at Millersville. Applicants must have completed 45-75 credits, including at least 9 at Millersville, and have a GPA of at least 3.7. Financial need is also considered. [APSCUF Office]

Leo Ascher Music Scholarship. Established by Mrs. Franzi Ascher Nash and awarded to the undergraduate music major who has best developed a musical composition based on one of Leo Ascher's original themes. [Music]

Elizabeth H. Aston and Barbara A. Donan Scholarship. Awarded to an incoming, full-time freshman student from Lancaster County in the teacher preparation program in the School of Education. Recipient chosen on the basis of excellence in scholarship (demonstrated by GPA and classes undertaken in high school, as well as nationally recognized test scores) and demonstrated financial need. [Admissions]

Laurene Cassady Auker Scholarship. Awarded to students demonstrating financial need. [Financial Aid]

Erin and Tom Baker Get Involved! Millersville University Student Leadership Award. Awarded to a student who is enrolled at Millersville full-time and is active in campus organizations and programs with a demonstrated interest in bettering the campus community. The student will have experience as a student leader and an enthusiasm for assisting and working with others from a diverse assortment of backgrounds. [Student Affairs]

Thomas R. Baker Memorial Scholarship. Awarded to a "worthy student of ability" upon completion of the junior year. The Wickersham Scholarship winner is not eligible for this award. [Honors & Awards Committee]

Kendig C. and Nancy Bare Scholarship. Awarded to a student in good standing who has demonstrated musical ability. [Music]

Beth Ann Barry Memorial Scholarship in Computer Science. Awarded to one rising junior with a GPA of 3.0 or greater within a range of 45 to 70 earned credit hours, has volunteer involvement with the campus and/or local community, is involved with computer science organizations or activities, and has demonstrated the greatest potential to succeed in a career related to computer science. The scholarship is renewable for one additional year, provided the student's GPA remains at 3.0 or greater. [Computer Science]

***Ann B. Barshinger Scholarship.** Awarded to a freshman student from York County with involvement in community/civic activities. Selection will be based on the high school academic and co-curricular record as recommended by the admissions office. The scholarship is renewable for up to three additional years depending upon the recipient remaining in good academic standing, with a CGPA of 3.0 and with continuing involvement in community/civic activities. [Admissions]

The Beideman Scholarship. Awarded to two to four students in the Honors College selected on academic merit, significant community involvement and/or financial need. [University Honors College]

***D. Luke and Elva W. Biemesderfer Scholarship for Merit in Foreign Languages.** Awarded annually to an entering full-time freshman majoring in a foreign language. The recipient shall be chosen on the basis of excellence in scholarship and leadership potential. Financial need may be taken into consideration but shall not be the major criterion. [Admissions]

Elva W. Biemesderfer Scholarship. Awarded to a student in the communication and theatre curriculum with a concentration in theatre. [Communication and Theatre]

***Biology Scholarships.** Awarded to incoming biology majors in the freshman year who are full-time students pursuing a B.S., B.A. or B.S.Ed. in biology. Selection shall be based on merit demonstrated by high school class rank or GPA performance, with emphasis on academic performance in mathematics and science courses, standardized test scores (SAT or ACT) and other criteria as determined by the admissions office and the biology department. [Admissions]

Biology Student Investigator Grant. Awarded for research, travel and presentation expenses for students engaged in research within the biology major. First preference is to students enrolled in Independent Biology Research and Biology Honors courses (currently Biology 498 and Biology 499). Covered expenses may include costs to attend, to prepare materials for presentation or to travel to conferences helpful to the student's research efforts, but may not include a stipend. Such travel may occur during the student's academic career at Millersville University or within one year of graduation, provided the travel is included in the student grant application. [Biology]

Grace Doan Bitler and Charles F. Bitler Jr. Memorial Scholarship. Awarded to a student who has both musical potential and financial need. [Music]

***Richard and Elaine Blouse Scholarship.** Awarded to a business administration major who has a minimum 3.5 high school academic average and a record of community service. The scholarship is renewable for no more than four years, provided the student maintains a minimum academic average of 3.0. Financial need may be taken into consideration in awarding the scholarship. [Admissions]

***Board of Governors Scholarships.** Awarded to academically talented students demonstrating exceptional extracurricular service, talents and other characteristics that will contribute to a diverse campus community. Pennsylvania residents who will enter as full-time, first-year freshman students in the fall may be considered for the full tuition. [Financial Aid]

***Elizabeth G. Botdorf Scholarship for English Studies.** Awarded to two full-time freshman and/or transfer students majoring in English. The students must volunteer at least five hours per semester for the English department. The scholarship is renewable, provided the students maintain a 3.0 GPA. [Admissions]

***Chip and Kathy Brabson, Ph.D. '70 Physics Scholarship.** Awarded to an incoming, full-time freshman physics major based on merit as demonstrated by high school class rank or GPA performance, with emphasis on academic performance in mathematics and science courses; standardized test scores (SAT or ACT); and other criteria as recommended by the admissions office and the physics department. Financial need shall be a significant criterion. First preference is to a qualifying student from Lancaster Catholic High School or Solanco High School in alternating sequence. The scholarship may be renewed for up to three years, provided the student remains a physics major in good academic standing. [Admissions]

J. Elvin Brenner 1909 Education Scholarship. Awarded to a rising sophomore majoring in education, with first preference to an emphasis on secondary education. The recipient will have a CGPA ranging from 2.5 to 3.25 and will be a middle-income student qualifying for financial need. The scholarship may be renewed for two additional years, provided the recipient maintains a 2.5 CGPA. The amount awarded to any individual student may not exceed one-half tuition, at which time an additional recipient(s) will be eligible. [Financial Aid]

Richard F. Brenner 1941 Industrial Technology Scholarship. Awarded to a rising sophomore majoring in Industrial Technology, with first preference toward a student receiving teacher preparation. The recipient will have a CGPA ranging from 2.5 to 3.25 and will be a middle-income student qualifying for financial need. The scholarship may be renewed for two additional years, provided the recipient maintains a 2.5 CGPA. [Applied Engineering, Safety & Technology]

Robert V. and Virginia K. Brown Scholarship in Industrial Technology. Awarded to a rising sophomore majoring in technology education or industrial technology. The scholarship may be renewed for four additional semesters, provided the student maintains a 3.2 GPA. [Applied Engineering, Safety & Technology]

C-P Flexible Packaging - Gary Nicholas Memorial Scholarship. Awarded to a full-time rising senior in the occupational safety and environmental health program at Millersville who matriculated from York County. Recipient must have a GPA of 3.2 or greater in the program, with consideration given to an acceptable overall GPA. Scholarship to be awarded primarily on the basis of merit, without necessary consideration of financial aid. [Applied Engineering, Safety & Technology]

***Michael K. and Neysa M. Callahan Scholarship.** Awarded to an entering or transfer student who is a child or spouse of a Benchmark Construction Company, Inc. employee. Scholarship selection will be based on academic average and community involvement. The scholarship is renewable for a maximum of three additional academic years, provided the student maintains a GPA of 2.5 or greater. If a student associated with Benchmark Construction Company does not qualify, then preference is given to a student from Hempfield High School or to a student athlete participating in the football program. The scholarship will not automatically be renewed to the Hempfield student or student athlete, but will be reviewed annually in case a student who is a child or spouse of a Benchmark Construction Company, Inc. employee qualifies. If not, the current Hempfield or student athlete recipient will receive the scholarship, provided the renewal criteria are met. This process will be followed each year a Benchmark family member is not eligible. [Admissions]

Dr. Rosario Caminero Scholarship. Awarded to a student minoring in the Latino/a Studies program. The student will have at least a 2.5 GPA and have completed at least 15 credits at Millersville University. [Latino Studies]

Campus Club Scholarships. Awarded to members of the junior class who have maintained a GPA of 2.0 or higher and who are dependent wholly or in large part upon their own efforts for financing an education. [Financial Aid]

Harry E. Canter Statistics Scholarship. Awarded to the junior or senior mathematics or computer science major who has shown the most outstanding performance in statistics. [Mathematics]

***Joseph Anthony Caputo and Linda Ryan Caputo Scholarship in Chemistry.** Awarded to an incoming chemistry major based on merit as demonstrated by class rank performance, scholastic aptitude examinations and other criteria as recommended by the admissions office. [Admissions]

Rachel Carson Biology Field Course Scholarship. Awarded to at least two students for field biology courses that require residence at a site other than Millersville University. Recipients must be in good academic standing overall (i.e., at least 2.00 QPA) and within their academic major, and pursuing a B.A., B.S. or B.S.E. in the sciences or mathematics. Although preference may be given to students in the marine biology option, students with majors in other areas of biology, other sciences or mathematics at Millersville University are encouraged to apply. Financial need may be considered, but it is not the deciding factor in selection. [Biology]

***Don R. and Judith C. Carter Scholarship for J.P. McCaskey High School Students.** Awarded to graduates of J.P. McCaskey High School who matriculated at Millersville University with intent to concentrate either in business or in one or more of the biological or physical sciences. The scholarship may be renewed three times, provided the recipient maintains a 2.8 quality grade point average in the year prior. [Admissions]

Lt. Col. Jo Ann Cashman Scholarship. Awarded annually to a student enrolled in the nursing curriculum who is in good academic standing. Preference may be given, but is not limited to, students who are in financial need. [Nursing]

Ernest and Mary Chamberlin Scholarships. Awarded to students in the adult continuing education program who have earned the highest number of credits (up to 90) and who have a GPA of at least 3.8 in their current program of study. [College of Graduate and Professional Studies]

Christina A. Ciallella Memorial Scholarship. Awarded to a female student who has completed at least 60 credits at Millersville, with no restriction upon major and based upon financial need. [Financial Aid]

Clark Associates, Incorporated Scholarship. Awarded to two rising seniors with demonstrated leadership ability. First preference will be given to students majoring in business administration, computer science or applied engineering. An application is required. [Financial Aid]

***Clark-Yalda Scholarship in Atmospheric Science.** Awarded to an incoming freshman majoring in meteorology. The recipient must be in the top 25% of her or his high school class and show evidence of strong science and mathematics skills demonstrated by a combination of class work and standardized tests. First preference is to a student from outside of Pennsylvania who is also of an underrepresented group; otherwise a qualifying out-of-state student; otherwise an underrepresented student from Pennsylvania; and finally, a qualifying student from Pennsylvania. (Gender is not to be considered an underrepresented category unless a particular gender falls below 30% of total enrollment in meteorology.) [Admissions]

Class of 1916 R. Bruce Walter Scholarship. Awarded for an academic scholarship as determined by the University president or designee. [Financial Aid]

Class of 1917 Sanders P. McComsey Scholarship. Awarded to a student who excels in English, payable at the end of the junior year. [English]

Class of 1927 Memorial Scholarship. Awarded to a sophomore majoring in education who has passed 45 credits or more, has an aptitude and ability for the profession of teaching, and who participates in University activities, especially intercollegiate sports. [Academic and Cultural Enrichment Committee]

Class of 1935 Scholarships. Awarded to junior students who are in good academic standing and demonstrate financial need. [Financial Aid]

Class of 1937 Scholarship. Awarded to a first-semester senior who intends to teach. The student must have a GPA of at least 2.5 and two letters of recommendation from teaching faculty. [Academic and Cultural Enrichment Committee]

Class of 1940 Scholarship. Awarded to a student who demonstrates financial need and is majoring in education. [Academic and Cultural Enrichment Committee]

Class of 1942 Scholarship. Awarded annually to an outstanding education major who has achieved academic excellence and has demonstrated financial need. [Academic and Cultural Enrichment Committee]

Class of 1943 Scholarship. Awarded to a senior in the School of Education based on exceptional potential as a classroom teacher, and who has earned a total of 96 credits with a GPA of 3.0 or better. [Academic and Cultural Enrichment Committee]

Class of 1944 Scholarship. Awarded to a student majoring in education who has completed at least 60 credit hours and has demonstrated financial need. [Academic and Cultural Enrichment Committee]

Class of 1947 Scholarship/Scholarship for Research Students in the University Honors College. Awarded to a student who is enrolled in the University Honors College, engaged in independent research related to his or her course of study at the University, and demonstrates a need for financial assistance. [University Honors College]

Class of 1948 Scholarship. Awarded to an upperclassman who demonstrates scholastic ability and financial need. [Financial Aid]

Class of 1951 Scholarship. Awarded as an academic scholarship (as determined by the director of financial aid) based upon merit, financial need or both. [Financial Aid]

Class of 1952 Scholarship. Awarded to a student majoring in education and entering his/her junior year (as determined by credits earned) with a GPA of 3.0 or greater. [Academic and Cultural Enrichment Committee]

Class of 1954 Scholarship. Awarded to a rising junior or senior who is majoring in a discipline in the College of Education and Human Services. The scholarship is to be merit based, upon prior volunteerism/enthusiasm for and successful coursework in the field of education. The scholarship is not renewable. [Dean of Education]

Class of 1958 Education Scholarship. Awarded as a scholarship for a matriculating student in education. The scholarship is not renewable. [Academic and Cultural Enrichment Committee]

Class of 1961 and 1962 Scholarship. Awarded to a student who is a rising sophomore or junior with a minimum GPA of 3.0 and demonstrated financial need. This scholarship is renewable for up to two additional semesters. First preference will be given to a student majoring in education. [Financial Aid]

Class of 2012 “Sophomore Slump” Scholarship. Awarded annually to a male and female student who are members of the sophomore class with a minimum 2.5 GPA and financial need. First preference will be for students who have performed community service. [Financial Aid]

***Edna Butler Cohen '27 Mathematics Scholarship.** Awarded to an entering female freshman mathematics major who has demonstrated superior academic excellence. The scholarship may be renewed for up to three additional years if a GPA of 3.0 or higher is maintained and the recipient continues to be a mathematics major. [Admissions]

Council of Trustees Scholarship. Awarded as tuition assistance to the student serving as a member of the Council of Trustees. The scholarship is renewable for the period of time the student serves the Council. [Student Affairs]

***Elisabeth Ruth Cramer/Truman A. Bender Herr Scholarship.** Awarded to a student majoring in art education who demonstrates financial need. The scholarship shall be presented to a first-year student and may be renewed as long as that student is in good academic standing and has financial need. [Admissions]

Martha B. Gross Culbertson and Bradley J. Culbertson Nursing Scholarship. Awarded to a student with financial need majoring in nursing who is in good academic standing. The scholarship may be renewed, provided the student remains in the major and is progressing toward graduation. First preference is for a qualifying student from York County. [Nursing]

Gladys Cooper Cunningham Scholarship. Awarded to a junior or senior who is most outstanding in early childhood education. [Early, Middle & Exceptional Education]

Beatrice U. Datesman Scholarship. Awarded to a junior/senior on the basis of scholarship, requiring at least a 3.0 GPA in the major. Student's financial need shall be a determining factor. [Financial Aid]

Aimee Decker Scholarship. Awarded to a deserving Millersville student who is in good academic standing and has financial need as determined by the director of financial aid. [Financial Aid]

Dr. Benjamin J. DeTito '77 and Anna DeBlois DeTito Scholarship. Awarded to a student with at least 30 credits completed, a CGPA of 3.0 or greater and financial need. First preference will be for a dual science/music major; second preference is for a science major with a music minor; third preference is for a music major with a science minor. If no students meet the preferred characteristics, the scholarship will be awarded to a biology major. The scholarship may be renewed for two additional years, provided the recipient continues to meet the criteria under which he/she was initially selected. [Financial Aid]

Dr. Cynthia C. Dilgard Scholarship. Awarded to a student with a minimum 3.0 GPA who has taken at least one course on Shakespeare within the English department. Students may be of any major. The applicant will submit an application with a short essay about how Shakespeare relates to his/her life. [English]

William A. Dinges Endowed Veterans Scholarship. Awarded to a veteran from Pennsylvania who is a full-time upperclass student demonstrating financial need, with an academic average of 3.0 or higher, and is renewable for 4-6 semesters. First preference will be given to a veteran who has served in a combat zone. [Financial Aid]

***Dr. Dominick '53 and Mrs. Helen DiNunzio Scholarship.** Awarded to a full-time incoming freshman from Bristol Borough High School in Bucks County, Pa., who graduated in the top 10% of his/her high school graduating class, who achieved an average score of 1200 on his/her SAT, and who exhibits high standards in character and leadership. If no student from said high school is accepted to Millersville University for admission, a student shall be chosen from among the other high schools in Bucks County, Pa. [Admissions]

William H. and Alma P. Duncan Scholarship in Elementary Education. Awarded to an early childhood or middle-level education major on the basis of financial need, excellence in scholarship, leadership qualities and service to others. [Early, Middle & Exceptional Education]

***Dean Dutcher Memorial Music Scholarship.** Awarded to an incoming freshman who maintains enrollment as a full-time music major at Millersville University, based on musical talent in an art performance medium. [Music]

***James C. Ebbert Education Scholarship.** Awarded to two incoming freshman students demonstrating financial need who have a minimum high school GPA of 3.0 and are in teacher preparation in the College of Education and Human Services. First preference for the scholarship is to a student from the Pennsylvania Migrant Education program, and then to a student participating in the Color of Teaching mentorship program. Scholarships will be disbursed to the students' accounts for tuition, fees, and room and board. [Admissions]

Economics Department Scholarship. Awarded to a declared economics major with a GPA of 2.5 and a 3.0 in courses for the major. Preference is given to a junior who has financial need. [Economics]

B. Jeanne Elder Voice Scholarship. Awarded to a full-time undergraduate student who has chosen to major in voice. Recipient will be selected by the music department and chosen on the basis of excellence in scholarship (utilizing high school GPA and classes undertaken, as well as nationally recognized test scores for entering freshmen and overall and major GPA for upperclassmen) and vocal performance skills and/or talent. Financial need may be taken into consideration but shall not be the major criterion. The scholarship is renewable for three additional years, provided the student maintains satisfactory academic progress. [Music]

Robert Elder Business Administration Scholarship. Awarded to a rising junior who is a business administration major demonstrating a strong commitment to the discipline; first preference is to a student with an interest in management. Student must be in good academic standing and have demonstrated financial need. [Management and Marketing]

Daniel G. Engle Scholarship. Awarded on completion of the junior year to a science major for superior scholarship and exceptional University and community service, and for maintaining a 3.0 GPA. [College of Science and Technology]

Paul W. Eshelman Memorial Scholarship. Awarded annually to a junior industry and technology major for excellence in wood technology, payable upon the student's enrollment for the second semester of the senior year. [Applied Engineering, Safety & Technology]

Ermaleen B. Etter Scholarship in Special Education. Awarded to senior student teachers enrolled in the College of Education and Human Services who have demonstrated professional excellence during their student-teaching experience with learning-disabled children. [Academic and Cultural Enrichment Committee]

Exide/Fittipaldi Memorial Scholarship. Awarded to children or spouses of employees of Exide Corporation, Lampeter Plastics Division, who are admitted as full-time undergraduate students. [Financial Aid]

***John Charles Falck Scholarship for Academic Excellence.** Awarded to an undergraduate student on the basis of academic excellence and good character, as determined by the director of financial aid, and renewable each year that the student maintains a passing academic average. [Financial Aid]

***Dr. Dominick J. and Frances McAndrew Fanani Memorial Scholarship.** Awarded to an incoming freshman in humanities who has achieved a minimum cumulative high school academic performance of 3.30, and has a strong record of high moral character as demonstrated by community service and volunteer experience. [College of Arts, Humanities and Social Sciences]

***Faraday Physics Scholarship.** Awarded to two entering full-time freshmen pursuing a B.S., B.A. or B.S.Ed. in physics. The recipients shall be chosen based on merit as demonstrated by high school class rank or GPA performance, with emphasis on academic performance in mathematics and science courses; standardized test scores (SAT or ACT); and other criteria as determined by the admissions office and the physics department. Financial need may be taken into consideration but shall not be the major criterion. The scholarships are renewable for two additional semesters, provided the students continue as physics majors with CGPAs of at least 3.0 and GPAs within the major and required related courses of 3.0. [Admissions]

***Margaret V. Farster and James R. Farster Scholarship.** Awarded to an incoming freshman student who is majoring in mathematics secondary education who has financial need. This scholarship will be renewable for an additional three years based upon successful academics and continuance in the major. [Admissions]

Donald Ferguson '70 Scholarship. Awarded scholarship(s) through a gift in memory of Donald Ferguson '70 by his mother, Elizabeth Mary Ferguson. [Financial Aid]

Valborg Fletty Memorial Scholarship. Awarded on the basis of scholarly ability and financial need to a student entering their senior year. [Financial Aid]

***Robert and Darlene Ford Scholarship.** Awarded to a graduating senior from Penn Manor High School. The scholarship is renewable for six additional semesters, provided the student remains in good academic standing. [Admissions]

Robert and Darlene Ford Merit Scholarship in Geography. Awarded to a geography major who has completed a minimum of 75 credits at Millersville University by the semester prior to award of the scholarship, and who maintains a GPA of 3.2 overall. [Geography]

Robert N. and Darlene I. Ford Scholarship for Strings. Awarded to a student majoring in music, with an emphasis in string instruments. First preference is to a graduate of Penn Manor School District. [Music]

Forty et Eight (Voiture 42) Scholarship for Nursing Education. Awarded to one or more students enrolled in the nursing program in pursuit of the Bachelor of Science in nursing, the Master of Science in nursing or the nurse practitioner certification program. The student should also demonstrate intent to be active in the practice of nursing upon completion of the program. The award will be made on the basis of academic potential and financial need as determined by the nursing faculty. The scholarship may be renewed on the recommendation of the nursing faculty. [Nursing]

Dr. Abram Foster Scholarship for Excellence in History. Awarded to a student who is a rising junior or senior in history with a minimum GPA of 3.5 and demonstrated financial need. [History]

Peter H. Freedman Scholarship. Awarded to a student majoring in music. [Music]

Arthur and Claribel Gerhart Scholarship in Biology. Awarded to a student who is majoring in biology, is in good academic standing and has completed 60 credits by the end of the semester in which the award is made. Preference is given to sophomores and juniors. [Biology]

Sally Gibson Music Scholarship. Awarded to a student majoring in music who has demonstrated financial need. [Music]

Dr. Joseph W. '53 and Susan Fulton '84 Glass Scholarship. Awarded as tuition to a rising junior, with first preference to a non-traditional student. Recipients must be in good academic standing (minimum 2.75 CGPA), with demonstrated financial need. The award is renewable for one additional year. [Financial Aid]

***Greek Council Scholarships.** Awarded to encourage academically strong high school students with extensive extracurricular involvement to attend Millersville University. [Admissions]

***Dr. and Mrs. Stephen Gring Scholarship.** Awarded to an incoming freshman student majoring in secondary education who has a minimum 3.5 high school academic average and a record of community service. The scholarship is renewable for no more than three years, and the student must maintain a minimum grade point average of 3.0. Financial need may be taken into consideration in awarding the scholarship. [Admissions]

***Nancy Zakrewski Groff Memorial Scholarship.** Awarded to a first-year student who has demonstrated academic achievement in high school; there is no restriction upon major or field of study. [College of Science and Technology]

John and Audrey Hallgren Scholarship. Awarded to a student majoring in music. [Music]

James E. Harf '61, Ph.D., Study Abroad Scholarship. Awarded to offset program expenses for Millersville students in good academic standing studying abroad in a semester- or year-long program or one of shorter-term duration sponsored by or coordinated through the Millersville University Office of Global Education and Partnerships (or its successor). The intention of the donor is to maximize the number of participants in study abroad in a given year through the distribution of the spendable income. First preference will be for students (1) with financial need, and (2) who are studying abroad for the very first time. It is understood that all of the financial support monies will be used as awards to the students and applied to expenses directly associated with the study-abroad trip, not for administrative expenses such as a processing fee, for example. Furthermore, recipients will be exempt from all such fees associated with the application process. [Director of the Office of Global Education & Partnerships]

The Williard O. Havemeier and Dr. Catherine Gibson Havemeier Scholarship in Computer Science. Awarded to a student engaged in computer science research. The recipient must have a QPA of 3.0 or greater. Use of the award is restricted to payment for related travel, materials and supplies, including software, and may not be used for student wages or the purchase of major equipment. The research award may be renewed for successive academic years if an overall 3.0 QPA is maintained. [Computer Science]

Don L. and Irene M. Hesel Scholarship. Awarded to a rising junior or senior student (having earned a minimum of 60 credits) in the teacher preparation program in the College of Education and Human Services. First preference is for a student from an under-represented population whose intention is to teach in an urban setting as demonstrated by participation in a program focused on teaching in an urban educational environment. If such intention cannot be met, the scholarship may be awarded to any student from an underrepresented population in the College of Education and Human Services. The recipient will be chosen on the basis of excellence in scholarship and leadership as demonstrated by participation in school and community activities. Financial need will also be a consideration. Should a junior student be selected, this scholarship may be renewed, provided that the criteria continue to be successfully met. [Academic and Cultural Enrichment Committee]

Dr. Alex Henderson Scholarship in Biology. Awarded to a sophomore or junior biology major who is engaged in a project addressing an issue in biology from an interdisciplinary perspective. [Biology]

***Mervin W. Hess Scholarship.** Awarded to a student(s) interested in a health professional career or a teaching career in math or science who has a high school average of 3.0 or higher and demonstrates financial need. The scholarship is renewable for four years as long as the student(s) maintains an overall academic average of 3.0. [Admissions]

Richard J. Hess Memorial Scholarship in Psychology. Awarded to a rising senior in psychology with good academic standing. [Psychology]

Albert, Christina and Eric Hoffman Scholarship for Humanities and Social Sciences. Awarded to a student in the University Honors College majoring in humanities and social sciences. [University Honors College]

Albert, Christina and Gregory Hoffman Scholarship for Science and Mathematics. Awarded to a student in the University Honors College majoring in science and mathematics. [University Honors College]

Alan S. and Adeline Holliday Scholarship. Awarded to a student who demonstrates scholastic ability and financial need. [Financial Aid]

***Kathlyn Houlahan Kodaly Music Scholarship.** Awarded as tuition to a full-time entering freshman who has chosen to major in music education. Recipient will be selected by the music department and chosen on the basis of performance excellence in musical skills and/or talent as demonstrated in their audition. Financial need may be taken into consideration but will not be the major criterion. [Music]

Hughes Foundation, Incorporated Scholarship. Awarded as tuition to a qualifying full-time student from Monroe County, Pa. Selected students will have a cumulative GPA of 3.0 or greater. Preference will be given to students with financial need, although need is not required. The scholarship is renewable for up to nine additional semesters, provided the student remains academically qualified and is progressing toward graduation. [Financial Aid]

***James Hughes Memorial Scholarship.** Awarded to an incoming freshman from the city of Philadelphia who has financial need. [Admissions]

***R. Clinton and Dorothy Hughes and Kathryn Hughes Seaber Vocal Music Scholarship.** Awarded to a freshman vocal music major. May be renewed for three additional years, provided the student remains a voice music major in good academic standing and is progressing toward graduation. [Music]

***Russell C. Hughes English Scholarships.** Awarded to two incoming freshman students majoring in English, for the period of time each is in good academic standing and majoring in English at Millersville University. Students must have a minimum academic average of 3.0 and a history of participation in high school publications. [Admissions]

***Iliffe/McCaskey Scholarship.** Awarded for a two-semester period to a first-year, independent undergraduate, full- or half-time student who is entering or returning to higher education. The recipient must have properly matriculated, with preference to a woman pursuing a degree. Chosen recipients will have limited access to conventional routes for obtaining student aid. This scholarship is intended to launch a nontraditional student's studies. [Admissions]

Hazel Jackson Scholarship. Awarded annually to an African-American student majoring in secondary education language arts or the humanities who is in good academic standing and demonstrates financial need. Preference will be given to students from Lancaster County. [African-American Studies]

Jackson Memorial Scholarship. Awarded to a graduate of Hempfield High School who completed junior year and attained distinguished achievement in early childhood or middle-level education. If no Hempfield graduate is eligible, the award will go to the highest ranking Early Childhood or Middle-Level Education major from a high school in Lancaster County. [Early, Middle & Exceptional Education]

Jackson Family International Education Scholarship. Awarded to offset program expenses for a student pursuing a global education opportunity abroad, including, but not limited to, study abroad, internship abroad, or student teaching abroad in a program sponsored by, or coordinated through, the Millersville University Office of Global Education and Partnerships (or its successor). This award will be given to a student who is from an underrepresented population and who has financial need. The recipient must be in good academic standing. Second preference will be for a student who is not from an underrepresented population, but who has financial need. [Global Education and Partnerships]

Michael Jamanis and Frances Veri Scholarship. Awarded to a student majoring in music who has financial need. [Music]

***William Malcolm Jordan Earth Sciences Scholarship.** Awarded to an incoming freshman student planning to major in geology or in earth sciences with a geology emphasis. Preference is to be given to graduates of Penn Manor High School. [Admissions]

Keever Biology Research Scholarship. Awarded to an undergraduate biology major to train the recipient in the methods and values of scientific research. Preference is given to those concentrating in botany. [Biology]

Esther Kilheffer Scholarship. Awarded to worthy students as determined by the University president or his/her designee. [Financial Aid]

***Beatrice M. Killough Scholarship for Spanish Studies.** Awarded to an entering freshman enrolled in the Spanish or Spanish education curriculum. The award may be renewed for up to seven additional semesters, provided the student maintains a 3.5 GPA in Spanish and a 3.0 overall GPA. [Admissions]

***Andrew and Clara Kissh Academic Scholarship.** Awarded to an incoming freshman student, based upon the student's notable high school academic performance. The scholarship is renewable, provided the student remains in good academic standing. [Admissions]

Esther S. Knaub Scholarship. Awarded to a York County student, as determined by the appropriate college officials. [Admissions]

***Richard G. Kokat/Andrei Georgescu Memorial Scholarship.** Awarded to an incoming freshman majoring in computer science, based upon both merit and financial need. The scholarship may be renewed for seven additional semesters, provided the recipient remains in good academic standing and is approved by the faculty of his/her chosen major/discipline. [Admissions]

James E. Koken Science Scholarship. Awarded to a student enrolled in a science curriculum or in science education who has completed 55 credits at Millersville University by the end of the semester prior to the semester in which the scholarship is awarded. Preference is given to a chemistry major. [College of Science and Technology]

Michael Kovach Scholarship. Awarded to a student majoring in a foreign language, with first preference to a student majoring in Russian. If a student who meets the above criteria cannot be found, the award will be made to a student with a minimum 2.5 GPA who has successfully completed at least three foreign language courses at the 200 level and above and/or plans to study abroad. [Foreign Languages]

***David B., Ph.D., and Kathryn Millar Kraybill Scholarship.** Awarded to an entering freshman from the Lampeter-Strasburg School District. Selection is based upon financial need for academic studies only, and use of the scholarship is limited to payment of tuition. The scholarship may be renewed for eight semesters or until graduation, whichever is first. [Admissions]

E. Kathryn Millar Kraybill '15 Scholarship. Awarded to a student with financial need majoring in education. [Academic and Cultural Enrichment Committee]

***Charlotte A. Lafferty History Scholarship.** Awarded to a student(s) majoring in history, interested in applied history, with a minimum high school average of 3.0 and who is active in school or community service. The scholarship is renewable for up to seven semesters as long as the student(s) maintains an overall academic average of 3.0 or higher. [Admissions]

***Landis Family International Scholarship.** Awarded to a first-year, first-time international student attending Millersville University using a student visa (or current U.S. requirements at the time) who demonstrates successful completion of secondary education in his/her home country and/or provides documentation of successful completion of mandated national exams. The recipient will be proficient in the English language as determined by standardized tests (SAT/ACT/TOEFL as examples). The scholarship will be offered to a student who demonstrates financial need. [Admissions]

Dr. Secunderabad N. Leela Scholarship in Social Sciences. Awarded to a junior majoring in the social sciences. The recipient must have a GPA of at least 2.5 and financial need. First preference is to an underrepresented student. The scholarship is renewable, provided the student continues to meet the criteria. [College of Arts, Humanities and Social Sciences]

***Richard S. Levandusky '58 Technology Scholarship.** Awarded to a freshman entering any of the AEST programs, to be distributed evenly over two semesters. [Applied Engineering, Safety & Technology]

Senator H. Craig Lewis Sigma Tau Gamma Award. Awarded to an active Sigma Tau brother with the highest cumulative GPA for the spring and fall semester of each calendar year. The active brother must take a minimum of 12 credit hours each semester and be in good standing with the fraternity. [Financial Aid]

Harry A. '65 and Carolyn J. Lohss Physics Scholarship. Awarded to a full-time student pursuing a B.A., B.S. or B.S.Ed. in physics. If the recipient is a freshman, that individual must be in the top 20% of her or his high school class or have a GPA of at least 3.0 on a 4.0 scale and show evidence of strong science and mathematics skills demonstrated by classwork and standardized tests. If awarded to other than a freshman, the recipient must have a CGPA of 3.0 or greater on a 4.0 scale. Financial need may be considered in selecting the recipient, but it is not to be the primary factor. With the annual approval of the physics department chairperson or designee, the scholarship may be renewed yearly for a maximum of six additional semesters beyond the freshman year, provided the student continues to maintain a departmental and overall GPA of 3.0 or greater. [Physics]

Jacqueline Long French Scholarship. Awarded to an upperclassman who has demonstrated interest in the study of the French language, culture, history or art and has a minimum 3.0 GPA with demonstrated financial need. First preference will be given to a student who is majoring in French; second preference to a student who is a French minor. If a student who meets the above criteria cannot be found, the award will be made to a student with a minimum 2.5 GPA who has successfully completed at least three French courses at the 200 level and above and/or plans to study abroad in France or in a French-speaking country. [Foreign Languages]

Gertrude Bettle Stoll and Esther Stoll Barlow Lowry Memorial Scholarship. Awarded to a junior early childhood education major on the basis of an empathic concern for the personal, emotional and educational needs of young children, a GPA of at least 3.0 and financial need. [Early, Middle & Exceptional Education]

Marburg Study Abroad Scholarship. Awarded to students studying abroad in Marburg. [Office of Global Education & Partnerships]

V. J. Marcelis Memorial Scholarship in Education. Awarded to a rising senior in good academic standing who intends to teach at the early childhood or middle level. Preference will be given to a student with financial need. [Early, Middle & Exceptional Education]

Violet F. Markey Academic Scholarship. Awarded as an academic scholarship as determined by the University president or designee. [Financial Aid]

The Martin Endowed Scholar. Awarded to a student demonstrating financial need and maintaining a 3.0 academic average; may be renewed for eight semesters. [Financial Aid]

Dr. William B. McIlwaine Scholarship in Earth Sciences. Awarded to a student majoring in earth sciences who has completed 60 semester hours of academic credit at Millersville University with a GPA of 3.2 or higher and demonstrates financial need. [Earth Sciences]

Francine G. McNairy and Gladys B. McNairy Scholarship for Civic and Community Engagement. Awarded to no more than two inner-city, underrepresented, educationally and economically disadvantaged students, with first preference to a student from the Pittsburgh, Philadelphia, Reading or Lancaster area, who participates, in the University's unpaid internship program focusing on civic engagement and/or community engagement, or civic engagement workshops under the auspices of the Civic and Community Engagement Research Project (CCERP). The student(s) must have demonstrated financial need and a minimum grade point average (GPA) of 2.5. The spendable income awarded is to be used for the student's/students' tuition expenses. [Civic and Community Engagement Research Project]

***MEDAL Fund Academic Scholarship.** Established by Millersville University employees and awarded to incoming freshmen on the basis of academic merit, and is renewable annually for those who maintain established academic standards. [Admissions]

***Joseph and Anita Meier Mathematics Scholarship.** Awarded as tuition to an entering freshman majoring in mathematics. The student must be in the top 10% of her/his graduating class or have an SAT math score of at least 600, and have a high school cumulative GPA of at least 3.5 on a scale of 4, or comparable if a different scale is used. Financial need may be a consideration but does not have to be the determining factor. The scholarship may be renewed, provided a recipient remains a mathematics major and achieves at least the following: freshman CGPA = 3.0 overall and in math; sophomore CGPA = 3.2 and math = 3.25; junior CGPA = 3.3 and math = 3.35. [Mathematics]

Dr. Dale H. Messerschmidt Technology Education Scholarship. Awarded to the full-time sophomore with the highest GPA at the end of the first semester of their sophomore year in the Technology Education Program. [Applied Engineering, Safety & Technology]

Robert S. and Helen R. Metzler Scholarship in Education. Awarded to a student enrolled in the early childhood or middle-level curriculum who has completed 45 credits at Millersville University. Chosen by the department on the basis of financial need and exceptional potential as an elementary teacher. [Early, Middle & Exceptional Education]

Millersville University Alumni Association Scholarship. Established by the Millersville University Alumni Association. Awarded to the student with the highest GPA who has earned more than 57 but fewer than 72 credits upon completion of the spring semester. [Alumni Engagement]

***Millersville University Alumni Association Legacy Scholarship.** Awarded to an incoming freshman who has ranked in the top 10% of his/her high school class and has an outstanding record of extracurricular activities and leadership. [Admissions]

Millersville University Business Associates Scholarship. Awarded to female nontraditional students from Lancaster County who are enrolled in the Continuing Education program. Students must be enrolled for a minimum of six credits with a GPA of 2.5 or better. The scholarship is renewable until the student has completed 15 credits in the Continuing Education program. [Millersville University Business Associates]

Millersville University Women's Giving Circle Dorothy L. Connolly Scholarship. Awarded as tuition to a rising senior female student in good academic standing with a CGPA of 2.5. The scholarship is to be awarded based on a combination of academic progress, financial need and personal statement. At the discretion of the selecting body, more than one recipient may be selected. [Financial Aid]

Charles E. Muench and Betty F. Muench Scholarship in Communications and Theatre Arts. Awarded to an entering senior majoring in communication and theatre arts who has demonstrated financial need, has a minimum overall academic average of 3.0 and exemplifies commitment to and excellence in the discipline of communications. [Communication & Theatre]

***Philip C. and Karen Ashkar Murley '63 Freshman Scholarship.** Awarded to an entering, full-time freshman from Pennsylvania majoring in either mathematics or physics. Recipient is chosen on the basis of excellence in scholarship (demonstrated by GPA and classes undertaken, as well as nationally recognized test scores) and involvement in school/community organizations. Financial need may be taken into consideration but shall not be a major criterion. The scholarship may be renewed for the sophomore year with an earned total of 30 credits and a GPA of 3.3 or higher. This scholarship is not intended for education majors. [Admissions]

Philip C. and Karen Ashkar Murley '63 Science Scholarship. Awarded as tuition to a rising senior from Pennsylvania majoring in either mathematics or physics. The recipient will have an overall GPA of 3.6 or higher and a GPA in the major of at least 3.75 with demonstrated performance in courses in the major. The recipient is chosen on the basis of excellence in scholarship; is an active participant in department projects (e.g., intern); is of superior research potential (e.g., evidence of successful research efforts); and is involved in organizations and activities outside the major. Financial need may be taken into consideration but shall not be a major criterion. [College of Science and Technology]

Music for Everyone Award. Awarded as tuition to full-time students who have chosen to major in music education. Selection based on GPA, performance in field teaching and Music 171, and demonstrated success in peer teaching. Financial need may be taken into consideration but will not be a major criterion. Student is expected to teach for three hours each week of the semester in collaboration with a music teacher in the School District of Lancaster schools (K-8 music program). [Music]

Music for Everyone Music Business Technology Award. Awarded as tuition to full-time students who have chosen to major in music business technology. Selection based on GPA, successful completion of 295 Music Studio Recording I, and demonstrated knowledge in the art of recording ensembles. Financial need may be taken into consideration but will not be a major criterion. Student is expected to record public school ensembles for a minimum of 30 hours over the course of the semester in collaboration with music teachers in the School District of Lancaster schools (K-8 music program). [Music]

***Edna H. Myers Mathematics Scholarship.** Awarded to an incoming freshman majoring in mathematics. [Mathematics]

***National Penn Bank Scholarship.** Awarded to an entering student in the bank's service area, with first preference to employees and their families of National Penn Bank. Scholarship selection will be based on academic average and community activities. The scholarship is renewable for three additional academic years, provided the student maintains a GPA of 3.0 or greater. [Admissions]

John David Neider Memorial Scholarship. Awarded to a junior who has made a significant contribution to the success of musical or dramatic performing arts at Millersville and has a GPA of at least 2.0. [Communication & Theatre]

Neimeyer-Hodgson Student Research Grant. Awarded to a student attending Millersville University in pursuit of the baccalaureate degree. [Alumni Engagement]

Paul H. Nichols Scholarship. Awarded to a junior earth sciences major, who is chosen on the basis of outstanding motivation and academic excellence. [Earth Sciences]

Joseph P. and Marianne S. '70, M'74 Nolt Family Scholarship. Awarded as tuition for thesis credit courses (up to 6 credits) and as a grant to support applied research associated with that same thesis. Thesis credit courses for the tuition portion may include thesis-related independent study courses. Research grant projects are to be of an applied and scholarly nature, with an intended outcome of an original, practical contribution to the field of education. The initial recipient will be a rising junior with a minimum CGPA of 3.0 pursuing an education degree in early childhood or middle-level education, although that may be expanded to additional candidates after the first year. Financial need may be considered but is not a required criterion. First preference is to a qualifying male student. Unused grant funds at the completion of the research project will be returned to the endowment principal. [University Honors College]

Nontraditional Student Scholarship. Awarded to an independent full-time or part-time undergraduate student who is returning to school, has earned at least 15 credits at Millersville University and has demonstrated financial need. [Financial Aid]

The John and Renee Genbauffe O'Leary Scholarship in Science Education. Awarded to a student majoring in the early childhood program, with a keen interest in science. Criteria for selection are prior academic performance, weighted significantly by the student's record of extracurricular/community service, and financial need. [Early, Middle & Exceptional Education]

***Fred E. Oppenheimer Scholarship.** Awarded to a freshman foreign language major based on academic excellence, dedication to foreign language study and financial need. [Admissions]

***James C. Parks Scholarship in Botanical Research.** Awarded to an incoming freshman with an interest in botany. The recipient of this scholarship is expected to develop a botanical research project, in collaboration with a faculty member, that will lead to the presentation of research results in the Dr. James C. Parks Memorial Lecture in the recipient's senior year. [Biology]

Dorothy J. Patterson English Scholarship. Awarded to a rising junior majoring in the English teacher preparation program and working toward a Bachelor of Science in English education with a minimum GPA of 3.0 in both the major and overall. The scholarship is renewable for two additional semesters, provided the student continues to meet the eligibility requirements. [English]

Patricia E. Pillar Scholarship. Awarded to a sophomore majoring in business administration with a minimum GPA of 2.5 and demonstrated involvement in campus extracurricular activities and/or community service. [College of Arts, Humanities & Social Sciences]

Predmore-Cornogg Scholarship. Awarded to a rising junior or senior majoring in geography who demonstrates a strong commitment to the discipline of geography, with first preference to a student with an interest in land planning. The recipient must be in good academic standing with a cumulative GPA of 2.5 or higher and demonstrate financial need. Renewable in the subsequent year. [Geography]

***Sydney Radinovsky Scholarship.** Awarded to an entering freshman biology major with an interest in biological research. The scholarship recipient will develop a research project in collaboration with a faculty member that will lead to the presentation of research results in the student's senior year. The student must rank in the top 10% and/or have a high school GPA of 3.5 or above and have scored 1100 or higher on his/her SAT. The scholarship may be renewed for up to three additional years contingent upon the student's continued progress in the biology course curriculum and maintenance of a GPA of 3.0. [Biology]

***Ratzlaff Scholarship.** Awarded to an incoming biology major. The scholarship may be renewed for three additional years if the student remains a biology major and maintains a GPA of 3.0 or greater. [Biology]

***Irene Renshaw Scholarship for Education.** Awarded to a freshman majoring in early childhood education (grades PreK-4) with a minimum GPA of 2.75, demonstrated financial need and involvement in community/volunteer service and/or student leadership. [Early, Middle & Exceptional Education]

Philip Ressler-Comcast Cable Memorial Scholarship. Awarded to a sophomore student from Lancaster County entering the junior year. Recipient must have core curriculum in political science, demonstrate service to the community and be in financial need. [Government & Political Affairs]

Retnew Associates Scholarship in Geology. Awarded to an outstanding student majoring in earth sciences (geology) with a GPA of 3.0 or higher. [Earth Sciences]

Allison Rickert Memorial Scholarship. Awarded to a student from any class year with a minimum cumulative GPA of 3.0 or greater who contributes to the George Street Carnival or the Creative Writer's Guild. [Communication & Theatre]

Helen C. Riso/Commuting Students Association Scholarship. Awarded to a commuting student who best demonstrates financial need, satisfactory academic performance and noteworthy service to the Commuting Student Association. [Financial Aid]

***Kyle Rodgers Scholarship.** Awarded to a student majoring in psychology with demonstrated financial need from the greater Lancaster region. The recipient will have a minimum GPA of 3.0. The award is renewable for three additional years, provided the student remains in good academic standing. [Admissions]

Jane Rohrer Scholarship. Awarded to a student majoring in music, with emphasis in piano or voice. First preference will be to a student of an underrepresented population. [Music]

Lina Ruiz y Ruiz Memorial Scholarship. Awarded to a junior student majoring in Spanish who, in the judgment of the professors of the Spanish section, has completed work in the field of Spanish studies. [Foreign Languages]

***Bernice R. Rydell Scholarship for Excellence.** Awarded as a four-year scholarship to an underrepresented student who is graduating in the top 10% of his/her high school class and is involved in community activities. The scholarship is renewable, provided the student maintains a minimum GPA of 3.0 and continuous involvement with student government/leadership or external community activities. [Admissions]

Florence Wilson Ryder '36 Scholarship. Awarded to a rising sophomore majoring in education with a minimum GPA of 3.0 who has demonstrated financial need. The scholarship is renewable for two additional years. [Academic and Cultural Enrichment Committee]

Richard Sasin Scholarship in Chemistry. Awarded to a student majoring in chemistry who is in good academic standing. Selection is based upon financial need and/or participation in intercollegiate sports. [Chemistry]

James W. and Sally C. Saxton Scholarship in Pre-Law. Awarded to a student interested in attending law school. The scholarship is renewable for up to six additional semesters, and selection and continuation are based on academic achievement (3.0), community involvement and financial need. First preference will be given to a student who is a member of the Lancaster YMCA. [Government & Political Affairs]

Dr. Nathan C. Schaeffer Memorial Scholarship. Awarded to a resident of Lancaster County who demonstrates financial need and who is enrolled in the final year of an undergraduate program or in a graduate program in education and maintains a 2.5 GPA. [Financial Aid]

Hazel Rork Schmuck Alumni Scholarship. Awarded to a full-time secondary education major with an overall 3.0 GPA who has completed at least 30, and no more than 60, credits prior to the fall semester in which the award is made. [Alumni Engagement]

Clarence Schock Foundation Scholarship. Four-year scholarships awarded annually to freshmen on the basis of high school records, competitive examination, personality and financial need. Only high school graduates from counties served by SICO Oil Company are eligible. [Financial Aid]

***Edward L. '64 and Kathy H. Schoenberger '69 Scholarship.** Awarded to an incoming freshman with a minimum GPA of 2.75 who attended a high school in Lancaster County, including but not limited to the School District of Lancaster. The scholarship is renewable up to three times for up to a total of four years, provided that the student is making progress towards graduation and continues to earn a minimum 2.75 GPA. First preference will be given to a student with financial need. [Admissions]

***Search for Excellence Scholarships.** Awarded to entering freshmen whose class rank places them in the top 10% of their high school graduating class or who possess a math/verbal minimum combined Scholastic Assessment Test (SAT I) score of 1100. Renewable annually to those who maintain satisfactory academic standards. [Financial Aid]

***Isaac F. Seiverling/Charles A. Rutter Scholarship in Mathematics.** Awarded to an entering freshman whose declared major is mathematics or mathematics education. Selection is based primarily on previous academic performance and secondarily on financial need. [Admissions]

***Ellen Currier Sellers Scholarship for Organ Performance.** Awarded to an incoming freshman or current University student who is a keyboard major, with preference given to music majors/minors studying organ. Renewable, provided the student continues to progress in organ study, maintains at least a 3.0 GPA and remains a music major/minor. [Music]

Gray H. and Ellen C. Sellers Merit Scholarship in Business Administration. Awarded to a junior majoring in business administration who will have successfully completed 90 or more credit hours prior to the semester to which the award is credited and whose extracurricular activity is related to business administration. The scholarship is to be awarded to only one student annually. [College of Arts, Humanities and Social Sciences]

Margaret K. Shenk Nursing Scholarship. Awarded to nursing students from Lancaster County who successfully complete two semesters of the nursing degree program. Financial need shall be considered. [Nursing]

N.E. Shoemaker Biology Teaching Scholarship. Awarded to the sophomore secondary education biology major who has earned the highest GPA. [Biology]

***Amos L. Shopf Scholarship for Lancaster County Students.** Awarded to a freshman who is a graduate of a secondary/high school in Lancaster County, Pa. Based on merit performance and financial need. May be renewed for three additional years, provided the student remains in good academic standing. [Admissions]

Dalton E. Smart Humanitarian Scholarship, Industry and Technology Department. Awarded to a full-time junior or senior industry and technology student making a significant contribution to the education of classmates through positive interactions, thought-provoking questioning and insight into the impact of technologies on humans. The recipient must maintain a 2.5 overall GPA. [Applied Engineering, Safety & Technology]

***Dr. Mary Alice Smith Scholarship.** Awarded to an incoming student enrolled in the early childhood, middle-level or special education curriculum at Millersville University. The scholarship is to be used for tuition and may be renewed for up to seven additional semesters, provided the recipient remains in good academic standing. [Admissions]

***Elizabeth Smithgall Scholarship.** Awarded to students who are ranked in the top 10% of their class, demonstrate financial need and have a native language other than English. [Admissions]

Blanche Henninger Snyder '18 Scholarship. Used to support a scholarship in a curriculum as determined by the president of the University. Recipient will be selected by the president or designate. [Financial Aid]

George F. Stauffer Scholarship. Established by Dr. George F. Stauffer and Lelia M. Stauffer. Awarded to a student who has completed the sophomore or junior year and has demonstrated academic excellence in a physical science major. [College of Science and Technology]

Steinman Communications Scholarships. Awarded to full-time undergraduates in good academic standing who have completed at least 15 but not more than 100 credits, have made outstanding contributions to campus communications and indicate an intention to continue to serve in a capacity that will advance campus communications. [Communication & Theatre]

***Nicholas W. Stephens Memorial Scholarship.** Awarded to an incoming freshman from the School District of Lancaster, Pa. The scholarship may be renewed for seven additional semesters, provided the student maintains an acceptable academic standing. [Financial Aid]

***Richard W. Stewart Scholarship.** Awarded to a child of an employee of R.R. Donnelley & Sons, or its successor, Lancaster, Pennsylvania. Recipient must be a full-time undergraduate; it is renewable up to a maximum of eight semesters of continuous enrollment. To renew, the student must have a 2.5 cumulative QPA and maintain full-time enrollment. Only one dependent per family shall ever be eligible to be the recipient of the scholarship. [Admissions]

Clyde S. and Pauline F. Stine Scholarship. Awarded annually to a resident assistant who is a member of the junior class and who has demonstrated outstanding service to resident life. [Housing and Residential Programs]

Drs. George F. and Helen A. '64 Stine Sociology Scholarship. Awarded to an outstanding sociology major who is a rising junior with a CGPA of at least 3.0 and an overall CGPA of 2.5. [Sociology/Anthropology]

***Drs. Helen A. '64 and George F. Stine Freshman Scholarship.** Awarded annually to an admitted freshman with a high school CGPA of at least 2.5 who attended at least two years of, and is a graduate of, Solanco School District, Lancaster County, Pa. Preference is given to a qualifying student with financial need. [Admissions]

***Susquehanna Bancshares, Inc., Scholarship.** Awarded to a full-time freshman who is an employee or dependent of an employee of Farmers First Bank or a Susquehanna Bancshares affiliate. The recipient is chosen based on high school GPA and activities, college entrance test scores and a letter from a senior bank administrator identifying the individual as an employee or employee dependent. Financial need may be considered but is not required. If no bank-affiliated candidate applies, the scholarship will be awarded to an entering freshman business or economics major. The award is not renewable. [Admissions]

***Susquehanna Engineering & Manufacturing Society—Gravell Scholarship.** Awarded to a freshman enrolled in an industry and technology program, in either the associate or bachelor's degree program, with a strong commitment to the major. [Admissions]

***Harry Symons Business Administration Scholarship.** Awarded to a student majoring in business administration who has a 3.2 high school academic average and a record of community service. The scholarship is renewable for no more than four years, and the student must maintain an academic average of 3.0. Financial need may be taken into consideration in awarding the scholarship. [Admissions]

Nadine Thomas Journalism Scholarship. Awarded to a third- or fourth-year female journalism student. The recipient will be selected by a faculty committee from the English department. [English]

***Gail Thomson/Penn Manor Scholarship.** Awarded to an admitted freshman who is a graduate of Penn Manor High School, Millersville, Pa., who has demonstrated financial need. [Admissions]

***Richard Cecil Todd and Claudia Pennock Todd Merit Scholarship.** Awarded to an entering freshman and renewable for a period of four years. The purpose of this scholarship shall be to attract and retain intellectually brilliant and/or exceptionally artistically talented students. [Admissions]

Richard Cecil Todd and Claudia Pennock Todd Student Loan and Financial Aid Scholarship. Awarded to support students in need of financial aid through scholarships and/or loans. [Financial Aid]

Phi Sigma Pi Joseph M. and Dorothy M. Torchia Scholarship. Established by the Sigma Chapter of Phi Sigma Pi Honor Fraternity and awarded to a chapter member who has demonstrated high scholarship, outstanding leadership and all-around service to the fraternity. [Phi Sigma Pi]

Mr. and Mrs. Joseph A. Tryon Scholarship. Awarded to a student majoring in music. [Music]

Yvonne and Sandra L. Turchi Biochemistry Scholarship. Awarded as a tuition scholarship to a rising senior biochemistry major who has completed a minimum of 90 credits by the end of the junior year and who is in good academic standing (cumulative CGPA of 3.0 or above), who has earned a B or better in CHEMISTRY 326: Biochemistry I, and who demonstrates financial need. [Chemistry]

United States Steel Scholarship in Business Administration. Awarded to a junior business administration major who has the highest GPA in courses taken within the department and who has demonstrated outstanding ability and dedication to the study of business. [College of Arts, Humanities and Social Sciences]

Dr. Kay Vandergriff '62 and Dr. Jane Hannigan Scholarship for Women. Awarded to a nontraditional (23 years of age or older, part-time or full-time) female student. The scholarship is renewable for eight semesters, provided the student maintains a minimum 3.0 GPA. [Financial Aid]

Thomas G. "T.J." Versprille Memorial Scholarship. Awarded as tuition to a student in good academic standing with a CGPA of 2.7 or greater. First preference is for a male student who is a member of the cheerleading squad; secondary preference is a student who is majoring in political science and participating in intercollegiate athletics; the alternate choice is a qualifying student majoring in political science. The scholarship may be renewed if the student continues to meet the criteria. [Director of Intercollegiate Athletics]

Helen Spahr Walker '43 Education Scholarship. Awarded to an early childhood or middle-level education major in good academic standing who has passed the Praxis I and received the required clearances (Act 34, Act 151 and FBI record check). The scholarship may be renewed up to three years, provided the student remains within the major in good academic standing. [Early, Middle & Exceptional Education]

Joseph E. Walker American History Scholarship. Awarded to a worthy junior who intends to teach American history on an elementary, secondary or college level. Secondary consideration is given to a junior history major who excels in American history. [History]

Dr. Samuel P. Wallace '41 Scholarship. Awarded to a rising junior or senior education major with financial need and a cumulative GPA of 3.0 or greater. First preference is given to a student who intends to teach in mathematics; second preference to teach science; third to teach other subjects. [Academic and Cultural Enrichment Committee]

Liselotte R. Wehrheim Scholarship in Nursing. Awarded to a nontraditional nursing student who, having completed a registered nursing program elsewhere, enrolls at Millersville University with the intent to receive a Bachelor of Science degree and practice nursing upon graduation. Eligible applicants are to have unusual or special circumstances affecting the completion of their education, such as simultaneously supporting or caring for his/her parents, children or a spouse. [Nursing]

Irwin Weinhold Music Scholarship. Awarded to at least one student who is an active participant in the music program. First preference is to those majoring in music. The award is renewable and may be received for a total of eight semesters, provided the student remains in good academic standing and involved in the music program. [Music]

Gerald S. Weiss Chemistry Scholarship. Awarded to a chemistry major who has demonstrated financial need and superior academic achievement in CHEM 251 Inorganic Chemistry I, a required course in inorganic chemistry for majors in the ACS-certified program leading to the Bachelor of Science degree in chemistry. [Chemistry]

Wickersham Memorial Scholarship. Awarded to the top-ranking junior for excellence of scholarship and exemplary character. [Honors and Awards Committee]

John G. Williams '64 Study Abroad Scholarship. Awarded as tuition for a student participating in a global education experience, including but not limited to a year abroad, semester abroad, winter and summer session programs, internship abroad, and student teaching abroad, sponsored by or coordinated through the Millersville University Office of Global Education and Partnerships (or its successor). This award will be given to a student who is a junior or senior with demonstrated financial need. First preference will be to a student majoring in the industrial technology education program. Second preference will be for a secondary education student. If neither first nor second preference can be met, a student majoring in education for middle-level (grades 4-8) or early childhood education (PreK-4) shall be selected. The recipient must be in good academic standing. [Global Education and Partnerships]

Robert F., Louise G., and Joan M. Williams Scholarship. Awarded to a junior education student concentrating in history. Awarded on the basis of prior academic performance. The recipient should best exemplify love of learning, courage, determination, honesty and a sense of humor. [History]

***The Kathleen C. Winder '60 Education Scholarship.** Awarded to a freshman majoring in early childhood or middle-level education and based on financial aid. The recipient must demonstrate high academic performance in high school and strong community service during the final two years of high school. The scholarship may be renewed for three additional years if the student maintains a 3.0 QPA, remains in early childhood or middle-level education, and actively pursues renewal prior to June 30 for the subsequent academic year. First preference is to a student majoring in early childhood education. [Admissions]

Dr. Charles R. Winter Scholarship in Pre-Med. Awarded to an upperclassman who is planning to attend medical school. [College of Science and Technology]

***Roy Lutz Winters Foreign Language Scholarship.** Awarded to an incoming freshman with an outstanding high school record who elects to major in foreign language or choose foreign language as part of a double major. [Admissions]

The WLPA—Hall Communications Award. Awarded to a junior student of color and/or a female who is majoring in communications with an option in broadcasting and who demonstrates financial need. [Communication & Theatre]

Janet Wood Memorial Fund. Awarded to a student enrolled as an education major and/or seeking teacher certification who has a GPA of at least 3.5. Undergraduate applicants must have obtained advanced professional standing, and graduate students must have obtained admission to degree candidacy status prior to applying for the scholarship. [Academic and Cultural Enrichment Committee]

Alan K. Wyand and Robert L. Shoener Scholarship. Awarded to a student majoring in music focused on voice, with first preference given to those with demonstrated financial need. [Music]

Sandra A. Yeager, Ph.D., Chemistry Scholarship. Awarded to a student majoring in chemistry with at least 30 credits passed, a CGPA between 2.75 and 3.25 and with demonstrated financial need. First preference will be given to a female student meeting the criteria. The scholarship may be received more than once. [Chemistry]

Dr. William Yurkiewicz Undergraduate Research Fellowship. Awarded to a student pursuing undergraduate research in cooperation with a faculty member in the biological sciences. First preference will be given to a junior or senior student who is conducting research with a high probability of publication in a peer-reviewed journal. The award is renewable, provided that the student continues satisfactory progress towards publication and progresses towards graduation. [College of Science and Technology]

SCHOLARSHIPS - ATHLETIC

For additional information about the following athletic scholarships, contact the head coach of the respective sport or the director of intercollegiate athletics.

Judy and Ralph Anttonen Women's Intercollegiate Field Hockey Scholarship. Awarded to a full-time junior or senior at the time of the award. The student must be a member of the women's intercollegiate field hockey team when selected and participate on the team in the year the scholarship is awarded. Recipients must have and maintain a GPA of 2.75 or greater and be progressing toward graduation.

Judy and Doc Roc Anttonen Women's Intercollegiate Volleyball Scholarship. Awarded to a full-time rising sophomore or junior who is a member of the women's intercollegiate volleyball team when selected and who expects to participate on the team in the year the scholarship is awarded. Recipients must have and maintain a GPA of 2.75 or greater and be progressing toward graduation. This scholarship may be received more than once at the discretion of the head coach and the athletic director; it is not automatically renewable.

Bishop Family Basketball Scholarship. Awarded to one player each on the men's and women's basketball teams who has a 2.0 CGPA and is progressing toward graduation.

***Gene A. Carpenter Football Scholarship.** Awarded to entering or enrolled athletes who have established themselves as outstanding intercollegiate football players. Recipients must meet all requirements for admission or be full-time students in satisfactory academic standing.

***Chapman Auto Group Athletic Scholarship.** Awarded to an incoming freshman student who is a Chapman Auto Group employee or the child or spouse of a Chapman Auto Group employee from either the Lancaster or Columbia business location. If no such student applies, the scholarship will be awarded to an incoming freshman student athlete demonstrating financial need as determined by the Financial Aid Office.

***George W. Cole Memorial Scholarship.** Awarded as tuition assistance to an incoming freshman baseball player with a high school GPA of 2.25. First preference will be for a qualifying player from an underrepresented population. The award may be renewed for a total of up to 10 semesters, provided the student continues as a member of the team and maintains a CGPA of at least 2.5.

The Bennett J. Cooper Baseball Scholarship. Awarded to financially assist student athletes participating in intercollegiate baseball.

***George Doherty Memorial Scholarship for Wrestling.** Awarded to athletes who have established themselves as outstanding wrestlers. Entering freshmen are selected based on their potential for outstanding achievement in intercollegiate wrestling; upper-classmen are selected based on their previous achievements as members of the wrestling team.

Faculty-Student Athletic Committee Awards. Plaques to the male and female varsity letter winners who have attained the highest GPA over seven semesters of academic work.

Elwood J. Finley Award. Presented to an outstanding male and female senior athlete. The award encompasses the career athletic accomplishments of each student.

***Glenn M. Flegal '54 Wrestling Scholarship.** Awarded to an incoming freshman with a proven wrestling record and who will participate in the Millersville wrestling program. If no freshman is available, then the student must be in good academic standing with a GPA of 2.0 or better and be a Millersville wrestler.

Renee L. Fraker Field Hockey. Awarded to the field hockey player who displays and embodies the selflessness, leadership and commitment to excel in both representing oneself and the Millersville field hockey program both academically and athletically.

Frerichs Family Women's Basketball Scholarship. Awarded to students who participate on the Millersville University women's basketball team.

Eugene Groff–Arthur Hulme Football Scholarship. Awarded to a student participating in intercollegiate football.

***Willard O. and Dr. Catherine Gibson Havemeier Scholarship for Football.** Awarded to one or more first-year students who matriculate at Millersville with a GPA of 3.0 or higher and who have demonstrated leadership qualities during high school.

Justin Flannery Hilton '07 Memorial Baseball Scholarship. Awarded as tuition to a member of the baseball team who plays the position of pitcher, is in good academic standing with a GPA of at least 2.3, and demonstrates strong team spirit and leadership on and off the field. Financial need is not a requirement but may be considered.

Floyd “Shorty” Hitchcock Memorial Wrestling Scholarship. Awarded to a student wrestler in good academic standing with financial need. The recipient must actively participate in the wrestling program the year the award is received.

Robert L. Jones '61 Soccer Award. Awarded to a male or female soccer player who best exemplifies the tradition of the scholar-athlete, who is in good academic standing with a CGPA of 2.75 or greater, and who demonstrates leadership, teamwork and service to the University or broader community.

***Dr. Frank Kafka Basketball Scholarship.** Awarded to an athlete who has potential for outstanding achievement in men’s intercollegiate basketball. Recipients must meet all requirements for admission or be full-time students in satisfactory academic standing.

***J. Henry Keneagy Scholarship in Athletics.** Awarded to an entering full-time freshman who intends to participate in intercollegiate athletics on the basis of potential for outstanding achievement in intercollegiate athletics and financial need.

William B. McIlwaine Women’s Basketball Scholarship for Academic Excellence. Awarded to a member of the women’s basketball team who has been a member of the team for a minimum of two years at the time of receiving the scholarship, and who has achieved a cumulative GPA of 3.2 or higher with demonstrated excellence on the basketball court.

***F. W. McLaughlin Football Scholarship.** Awarded to athletes who have established themselves as outstanding football players. Entering freshmen are selected based on their potential for achievement in intercollegiate football; upperclassmen are selected based on their previous achievements as members of the football team.

***MEDAL Fund Athletic Scholarships.** Established by Millersville University employees and awarded to athletes who have potential for outstanding achievement in intercollegiate football, wrestling, men’s basketball or women’s basketball. Recipients must meet all requirements for admission or be full-time students in satisfactory academic standing.

***Men’s Basketball Memorial Scholarship.** Established in memory of Eugene Rutherford, Class of 1940, and other former Millersville basketball team members now deceased. Awarded to athletes who have potential for outstanding achievement in men’s intercollegiate basketball. Recipients must meet all requirements for admission or be full-time students in satisfactory academic standing.

Millersville University Alumni Association Athletic Scholarship. Awarded to one male and one female athlete who participate in NCAA-recognized sports at Millersville University. Students must be full-time, maintain an overall GPA of 3.0 and have passed 24 credits but no more than 60 credits.

Lois T. Morgan '54 Field Hockey Scholarship. Awarded as tuition to one or more members of the field hockey team. First-time recipients must have a GPA of 3.0 or greater; incoming freshmen must have equivalent high school grades. Recipients must demonstrate above-average athletic talent. The scholarship may be renewed at the discretion of the athletic director and field hockey coach, provided recipients attain PSAC Scholar Athlete status (currently a 3.25 GPA) and demonstrate continued, active and above-average contribution to field hockey.

Lois T. Morgan '54 Student-Athlete Endowed Scholarship. Awarded as tuition to one or more student athletes. There is no sport preference; however, if funds are divided, they shall benefit recipients from both men’s and women’s sports. First-time recipients must have a GPA of 3.0 or greater; incoming freshmen must have equivalent high school grades. Recipients must demonstrate above-average talent in their sports. The scholarship may be renewed at the discretion of the athletic director and respective coaches, provided recipients attain PSAC Scholar Athlete status (currently a 3.25 GPA) and demonstrate continued, active and above-average contribution to their sports.

The B. Todd Myers Memorial Golf Scholarship. The annual spendable income will be awarded to students who participate on the Millersville University men’s and women’s golf teams.

Sandy Peters Field Hockey Award. Awarded as tuition credit to one or more talented field hockey players. Recipients must have GPAs of at least 2.75 and be active on the team in the academic year the scholarship is awarded. If a recipient is an entering freshman, that individual’s high school GPA must be at least 2.75, and she must commit to play field hockey at Millersville University upon arrival. The scholarship can be renewed, provided the student(s) annually meets the criteria.

Aurora Wickey Pucillo Award. Awarded to an outstanding female athlete who has participated in more than one varsity sport and lettered in at least one sport. Recipient must exhibit outstanding traits of loyalty, leadership and sportsmanship, and have a GPA of at least 2.5.

John A. Pucillo Memorial Scholarship. Awarded in alternating years on the basis of financial need to a female or male who has participated in intercollegiate athletics for at least two years, has completed at least 60 credits and has a GPA of at least 2.0.

***Maryann Kitson Raspen Scholarship in Women’s Athletics.** Awarded to an entering female freshman who has registered as a full-time student and has declared an intention to participate in athletics. The recipient shall be chosen on the basis of potential for outstanding achievement in intercollegiate athletics.

Theodore Rupp Wrestling Scholarship. Awarded to a student who participates in intercollegiate wrestling and demonstrates financial need.

***Samuel J. Seaber Jr. Baseball Award.** Awarded to up to two active members of the men’s baseball team who are incoming freshmen. The student’s high school CGPA must have been 2.75 or greater. The award may be renewed if the student(s) remains active on the team and sustains the required CGPA.

Samuel J. Seaber Jr. Softball Award. Awarded to up to two active members of the women's softball team who have CGPAs of 2.75 or greater. The award may be renewed if the student(s) remains active on the team and sustains the required CGPA.

Robert L. Slabinski Scholarship. Awarded to a student(s) participating in intercollegiate women's basketball who has a minimum academic average of 2.5 and has 60 or more academic credit hours. The recipient(s) will be selected by the head women's basketball coach, with the intention to provide additional assistance for the student(s) to continue her education.

The Jeff Sollars '91 Pursuit of Excellence Baseball Award. Awarded to one or more members of the baseball team who are in at least their second year on the team. The recipient(s) must have financial need, a GPA of 2.0 and demonstrate an above-average commitment to the sport, team leadership or exceptional effort.

***Mike Stone Wrestling Scholarship.** Awarded to a student who has established himself as an outstanding wrestler.

***Franklin R. Thomas '39 Football Scholarship.** Awarded to a student who is an entering freshman who will participate in intercollegiate football, has an entering high school GPA of at least 3.0 and demonstrates financial need. The scholarship is renewable, provided the student remains in good academic standing (as defined by the University) and eligible to participate in intercollegiate football.

***Richard C. Todd Scholarship.** Established by Dr. Todd and Claudia Pennock Todd, and awarded to athletes who have established themselves as outstanding basketball players. Entering freshmen are selected based on their potential for achievement in intercollegiate basketball; upperclassmen are selected based on their achievements as members of the basketball team.

Richard Cecil Todd and Claudia Pennock Todd Basketball Scholarship. Awarded to a student who proves himself as an outstanding basketball player.

***James E. Treasure Memorial Football Scholarship.** Awarded to an incoming freshman who has good academic high school preparation and will participate in intercollegiate football. The student will receive the scholarship each year he is in good academic standing and eligible to participate in intercollegiate football.

Marjorie A. Trout Women in Athletics Scholarship. Awarded to female student athletes who are rising juniors or seniors with a CGPA of 2.8 or above.

***University Athletic Scholarships.** Awarded to student athletes on the basis of potential for outstanding achievement in intercollegiate athletics. Recipients must meet all requirements for admission and maintain satisfactory academic progress.

Walter B. Waetjen '42 Ed.D. Football Scholarship. Awarded as tuition to students who do/will play football. Incoming freshman recipients must have graduated in the top half of their class and have strong potential to contribute to the football team. Preference is to be given to students with financial need. Non-freshman recipients must be in good academic standing, with a CGPA of 2.25 or above, progressing toward graduation, and be active members of the football team the academic year the award is received. First preference is for students playing the lineman position. Award may be received more than once if criteria continue to be met.

Barbara J. Waltman '73 Lacrosse Award. Awarded as tuition credit to one or more talented lacrosse players. Recipients must have GPAs of at least 2.75 and be active on the team in the academic year the scholarship is awarded. If a recipient is an entering freshman, that individual's high school GPA must be at least 2.75, and she must commit to play lacrosse at Millersville University upon arrival. The scholarship can be renewed, provided the student(s) annually meets the criteria.

Joseph B. and Judith S. Wilt Men's Basketball Scholarship. Awarded as tuition to a member of the men's basketball team. If a returning player or transfer student, the individual must have a GPA of 2.5 or greater. If offered to an incoming freshman, the individual must have similar academic qualifications. This award may be renewed for a total of 10 semesters, provided the recipient remains a member of the team and continues to meet the academic qualifications.

Women's Athletic Scholarships. Awarded to two junior female athletes.

UNIVERSITY AWARDS

An award is a cash grant or gift made directly to a student or a student's account, or a mention on a University plaque in recognition of the student's achievements. For more information on any of these awards, contact the department found in the brackets [] at the end of the award criteria.

AFSCME Local 2421 Award. Awarded to students who are full-share members of AFSCME Local 2421 or dependents of full-share member of AFSCME Local 2421 and who are currently attending Millersville University. Award funds will be used to cover costs related to receiving a degree at Millersville University, including but not limited to textbook costs, fees, and room and board. Recipients must be in good academic standing. Students must be enrolled in a degree-seeking program and have completed a minimum of 30 credits. An application is required. The scholarship is renewable, but recipients must go through the application process each year. [Financial Aid]

American Chemical Society, Millersville University Student Affiliate Award. Recognition on a plaque in Caputo Hall to a graduating senior of high academic standing who has contributed outstanding service to the chemistry department and the chapter. [Chemistry]

American Chemical Society, Southeastern Pennsylvania Section Award. The Merck Index is awarded to the outstanding senior chemistry major. Recognition on a plaque in Caputo Hall and a choice from several reference works and journal subscriptions are awarded. [Chemistry]

American Chemical Society, Undergraduate Award in Analytical Chemistry. A subscription to *Analytical Chemistry* and honorary membership in the Division of Analytical Chemistry to the outstanding student in analytical chemistry. Recognition on a plaque in Caputo Hall. [Chemistry]

American Chemical Society, Undergraduate Award in Inorganic Chemistry. Awarded to the student who demonstrates academic excellence (minimum of 3.5 GPA) and outstanding performance in CHEM 452: Advanced Inorganic Chemistry, and who plans a future career in chemistry. [Chemistry]

American Chemical Society Undergraduate Award in Organic Chemistry. Awarded to the top graduating senior student majoring in chemistry or biochemistry who has demonstrated excellence in organic chemistry based on a combination of research experience, coursework and a desire to pursue a career in chemistry. The student must be enrolled at Millersville University for the current academic year. [Chemistry]

American Institute of Chemists Award. A one-year associate membership in AIC and recognition on a plaque in Caputo Hall to the outstanding graduating chemistry major, based on character, academic standing and potential to become a successful chemist. [Chemistry]

American Society of Safety Engineers, Lehigh Valley Chapter Award. Awarded to a rising junior or senior majoring in Occupational Safety and Environmental Health with a minimum GPA of 3.0 and demonstrated financial need. [Applied Engineering, Safety & Technology]

American Society of Safety Engineers/Raymond C. Mullin Award. Presented by the Central Pennsylvania Chapter of ASSE each semester to a junior or senior occupational safety and hygiene management major who has completed at least 15 credits of occupational safety and hygiene management courses and 12 credits of related courses, with a GPA of at least 2.5 overall and 3.0 in health safety management courses. [Applied Engineering, Safety & Technology]

Athletic Coaching Minor Faculty Award. Presented to the outstanding graduating male and female athletic coaching minor students, based on academic excellence, campus leadership, sportsmanship and community service. [Wellness & Sport Sciences]

Guy Kurtz Bard Award. Awarded to a senior political science major in odd-numbered years and to a senior history major in even-numbered years for outstanding ability in political science and history. [History]

Esther Herr Bear Award. Awarded to worthy and deserving students who excel in music. [Music]

Anne E. Beyer Award. Awarded to seniors in early childhood or middle-level education for outstanding performance in student teaching. Recipients must have spent two full academic years at Millersville in preparation for teaching. [Early, Middle & Exceptional Education]

Cora Catharine Bitner Music Award. Awarded to students who are proficient in musical performance and have rendered loyal service to the musical activities of the University. [Music]

Henry Franklin Bitner Science Prizes. Awarded to two seniors annually, one in physical science and one in biological science. [College of Science and Technology]

The Black Student Union/Dr. Melvin Allen and Jennifer Coleman Award. Awarded to a member of the Black Student Union who has a CGPA of 2.5 and who has demonstrated service to the Millersville campus community through active membership and involvement in campus organizations. [Black Student Union]

Lee E. and Laura H. Boyer Award. Awarded to two seniors: one who is a computer science major excelling in mathematics, and one who is a mathematics major excelling in computer science. [Computer Science]

A.G. Breidenstine Award. Established by friends of Dr. A.G. Breidenstine in recognition of his service as dean from 1955 to 1965. Awarded to the student whose honors work is judged to be most outstanding. [Honors and Awards Committee]

The Chautauqua School of Art Ceramics Scholarship. Awarded to a junior or senior Millersville University student who has completed at least two semesters of study in Ceramics at Millersville University and is accepted to study ceramics at the Chautauqua Institution, Chautauqua School of Arts (Chautauqua, N.Y.) seven-week summer program. [Art and Design]

Chemical Rubber Company Chemistry Achievement Award. A book to the outstanding student in the general chemistry sequence. [Chemistry]

Class of 1866 Award. Awarded to two seniors for excellence in mathematics. [Mathematics]

Class of 1895 Frank Albert Award. Awarded to a graduating senior on the basis of scholarship and all-around service to the University. [Honors and Awards Committee]

Class of 1898 Award. Awarded to the second-ranking member of the junior class, payable after graduation. [Honors and Awards Committee]

Class of 1910 Award. Awarded to a student for excellence in English at the end of the student's senior year. [English]

Class of 1911 H. Justin Roddy Memorial Award. Awarded to a graduating senior who, in student teaching, shows the greatest promise of becoming a successful teacher of the sciences. [College of Science and Technology]

Class of 1922 Esther E. Lenhardt Award. Awarded to a senior who has demonstrated outstanding proficiency in the use of English. [English]

Class of 1928 Isaac F. Seiverling Award. Awarded to a junior for proficiency in mathematics. [Mathematics]

Commission in Cultural Diversity Award. Awarded based on academic performance and evidence of a commitment to diversity through service at the University, demonstrated through a competitive application and essay. [Cultural Diversity Committee]

Commonwealth of Pennsylvania Universities Biologists Award. Awarded on the basis of academic standing, excellence in biology and research potential. [Biology]

Computer Science Award. Awarded to a senior computer science major for outstanding achievement in computer science courses. [Computer Science]

Cunningham Art Foundations Achievement Award. Awarded to a full-time student who has taken all four art foundation courses (currently Two-Dimensional Design, Drawing I, Three-Dimensional Design and Drawing II) at Millersville University and obtained a GPA in those courses of at least 3.0. Recipient must be a declared visual fine art major (painting, drawing, ceramics, printmaking, photography, metals or sculpture) seeking the B.F.A. degree, and have excelled in the foundation courses and shown promise as a visual fine artist. An application is required. [Art & Design]

Dilworth-McCollough English Award. Awarded to a student who has achieved excellence in English literature. [English]

Laura B. Doering Library Service Award. Presented to senior student library workers who have demonstrated exceptional commitment on the job. [Library Sciences]

Dramatics Service Award. Presented by Citamard Players to a graduating senior for outstanding service in the area of dramatics. [Communication & Theatre]

Earth Sciences Awards for Academic Excellence. Recognition on a plaque in Caputo Hall to seniors for excellence in earth sciences. [Earth Sciences]

EAPSU Award. A merit award for overall excellence in English given by the English Association of Pennsylvania State Universities. [English]

Michael W. Eisenberger Choir Award. Awarded to the graduating senior University choir member who has been recognized by fellow choir members as emulating qualities of leadership, musical ability and friendliness displayed by the late Michael W. Eisenberger during his association with the choir and the University. [Music]

Excellence in Printing Technology Award. Presented annually to a senior industry and technology student who has completed 90 credits, possesses a GPA of at least 3.0, consistently produces high-quality work, displays innovative ideas and demonstrates outstanding commitment to the printing profession. [Applied Engineering, Safety & Technology]

Dominick J. and Frances M. Fanani Junior/Senior Award. Awarded to a full-time junior or senior student in the arts and humanities for outstanding scholarship and character. [College of Arts, Humanities and Social Sciences]

Betty J. Finney Community Service Award. Awarded to a senior psychology major who has demonstrated outstanding community service relevant to the field of psychology. Recipient must have attained a CGPA of at least 3.0. Selection is by vote of the psychology faculty. [Psychology]

Antone K. Fontes Health Professions Award. Reference books presented to three graduating seniors—one each from premedical/pre dental, nursing and allied health programs—who have demonstrated outstanding ability. Selections are made on the basis of GPA and recommendations. [Biology, Nursing, and Dean of College of Science and Technology]

Marion G. Foster Award. Awarded to a junior social work major who best exemplifies those qualities of Marion G. Foster: dedication to the social work profession, a genuine respect for people and demonstrated academic excellence under extraordinary circumstances. [Social Work]

Alice R. Fox Memorial Award. Awarded to a student who has achieved excellence in English. [English]

Leah Fudem Photographic Service Award. Awarded to two students for outstanding photographic service to *The Snapper* or the *Touchstone*. [Snapper]

Verda F. Fulmer Award. Awarded annually to an outstanding senior in early childhood or middle-level education at the end of the school year. [Early, Middle & Exceptional Education]

Fulton Bank Award in Economics. Awarded to a student who, in the judgment of the economics department, has written the best essay on an aspect of banking. [Economics]

Roy and Mary Garden Gamber–Helen L. Koontz Award in Education. Awarded to two students (junior or senior status) who have demonstrated a commitment to a career in teaching. One award must be directed to a candidate committed to early childhood or middle-level education. [Elementary, Middle & Exceptional Education]

Geography Faculty Award. A certificate and an appropriate gift, usually a book, presented annually by the geography department faculty to a geography major who graduates with honors. [Geography]

D. Joan Godfrey Nursing Award. Awarded to one to three senior nursing majors on the basis of participation in the nursing program, club and other campus activities; involvement in the nursing profession and academic standing. [Nursing]

John K. Harley and Grace W. Evans Award. Awarded to a student who has maintained the highest standing in scholarship and deportment during both his/her junior and senior years, and who is of high moral character and exemplary habits. [Honors and Awards Committee]

James Hamilton and Lucretia Boyd Hartzell Piano Award. Awarded to a junior or senior piano student who possesses extraordinary talent, has shown considerable progress and has contributed to the musical enrichment of the University community. [Music]

Jeffrey Hawthorne Memorial Award. Awarded to a rising sophomore majoring in elementary education with a minimum GPA of 2.5 who has demonstrated financial need. The scholarship is renewable for five additional semesters, provided the student continues to meet the criteria. [Early, Middle & Exceptional Education]

Frank R. Heavner Memorial Award. Awarded to the English major who has the highest average in at least nine credits of linguistics courses. [English]

Earle M. Hite Award. Awarded to a member of a student publication of Millersville University who has shown enthusiasm and dedication in the production of *The Snapper* or *Touchstone* and meets the following criteria: has worked for the publication for at least four semesters; is versatile and willing to help with any task; and has made notable contributions to the betterment of the publication and the University. This award may be given to an editor, writer, reporter, photographer, business manager, member of the circulation or advertising department, or other member who contributes to the production of the publication. [Snapper]

The Reverend Lewis Merwin Hobbs Medallion/Dr. Dominick '53 and Mrs. Helen DiNunzio Award. Awarded to graduating seniors achieving summa cum laude (4.0 academic average overall). [Honors and Awards Committee]

Elsie Hostetter Award. Presented by the early childhood faculty to the outstanding senior early childhood education major. [Early, Middle & Exceptional Education]

Ralph J. Hyson Memorial Award. Awarded to the senior French major judged outstanding in French studies. [Foreign Languages]

Instrument Society of America Central Keystone Section Outstanding Student Award. Awarded to a junior or senior industry and technology student who possesses a GPA of at least 3.0 and is committed to specializing in and demonstrating outstanding performance in transportation/energy/power. [Applied Engineering, Safety & Technology]

Ireland 500 Award. Awarded to a student who is participating in a global education experience in Ireland (including Northern Ireland), including study abroad (any length program), student teaching or internship abroad. First preference will be given to a student with financial need. An application is required. [Global Education and Partnerships]

Henry J. Kauffman Award in Metal Technology. Awarded to a senior industry and technology major who has attained distinguished achievement in metals technology. [Applied Engineering, Safety & Technology]

Richard C. Keller Award in American History. Awarded to a senior history major who has shown strong interest and capability in American history. [History]

Martin and Anna Zimmerman Kondor Award. Awarded to a senior in early childhood or middle-level education with a 3.35 GPA, excellence in student-teaching experience, outstanding personal and professional characteristics, and dedication to teaching. [Early, Middle & Exceptional Education]

Louis and Margarete Koppel Awards in European History and German Literature. The awards are given to two graduating seniors, one excelling in the study of European history and the other excelling in German language and literature. [History and Foreign Languages]

Edward J. Laucks Memorial Sertoma Award. Awarded to a student who has achieved excellence in the communication major. [Communication & Theatre]

Jack Loose Sons of the Revolution American History Research Award. Awarded to a junior, senior or graduate student who is pursuing current research on the American Revolution. First preference will be a student whose research focuses on the American Revolution in Lancaster County. Second preference will be a student whose research focuses on the American Revolution in general, and third preference will be a student doing research on a topic within American history. An application is required. The recipient will be selected by the history department after an initial review by the Lancaster County Chapter, PSSR. [History]

Susan P. Luek Award for Graduate Study in Psychology. Awarded to up to four graduating psychology majors who have a CGPA of 3.5 or higher and show considerable promise for graduate study in psychology or related areas. [Psychology]

Susan P. Luek University Honors College Award. Awarded to up to four graduating seniors in the University Honors College who have a CGPA of 3.5 or higher and show considerable promise for graduate study or post-baccalaureate professional school. [University Honors College]

John Mentzer Award in Special Education. Awarded to a junior who is enrolled in the certification program in special education and has demonstrated potential for becoming an outstanding teacher. [Special Education]

Helen R. Metzler Undergraduate and Graduate Reading Award. Awarded to an early childhood or middle-level education major and a graduate student who completed their Reading Specialist certification who has an interest in reading and has shown excellence in classroom performance and knowledge of reading techniques. Must have completed all certification courses at Millersville University. [Early, Middle & Exceptional Education]

Music Faculty Award. Awarded to the outstanding music education graduate. [Music]

C. Maxwell and Edna H. Myers History Award. Awarded to a history major who has earned a minimum of 85 credits; based on academic accomplishment and service to the department and the University. [History]

Carol J. Myers Music Educators Award. Awarded to a music education major in good academic standing entering his/her senior year, prior to the semester in which the student will be student teaching. Preference given to students concentrating in vocal studies. [Music]

Dr. Erik and Mrs. Jeanne Nakjavani Award for International Study. Awarded to up to five students for expenses related to study abroad and/or international internships. Students will be selected based upon the following criteria: academic merit, the impact of the education abroad on their professional and personal development, and a commitment to promote international education upon their return to Millersville University. First preference will be given to students with financial need. An application is required. Second preference, or if no student meets the above criteria, the award will be offered to up to five students who are pursuing an academic program with an international or comparative focus, including—but not limited to—Government, International Studies and Foreign Languages. [Global Education and Partnerships]

Jay B. Niesley '73 Memorial Student Leadership Award. Awarded for outstanding leadership to a student with at least 45 completed credits and a cumulative GPA of 2.5. Selection will be based on the student's contributions to Millersville University and involvement in leadership roles, including but not limited to student affairs and government. [Student Affairs]

Omicron Delta Epsilon Economic Research Award. Awarded to an economics major who demonstrates academic excellence through economic research by presenting the best research paper at a research conference, symposium, seminar or poster session. The recipient will be chosen by the chair of the Millersville University economics department and/or the advisor to Omicron Delta Epsilon (Millersville University chapter). [Economics]

Burl N. Osburn Award. Awarded annually to a student who excels in technology education. [Applied Engineering, Safety & Technology]

***Pennsylvania Bandmasters Association Award.** Awarded to an incoming freshman music major who excels in band instrument performance. [Music]

Pennsylvania Institute of Certified Public Accountants Award. A plaque will be given to a graduating senior who has demonstrated outstanding commitment to the profession of accounting. Selection is based on high performance in accounting in particular and on excellent general performance, plus participation in the co-curricular activities in business administration. [Accounting and Finance]

Phi Kappa Phi Award. Awarded for the best essay written by an undergraduate member of Phi Kappa Phi Chapter 211. [Phi Kappa Phi]

Phi Sigma Pi Award. Awarded to a graduating Phi Sigma Pi member for scholarship, leadership, character and outstanding service to the University. Service keys are awarded to graduating members of the fraternity using the same criteria. [Phi Sigma Pi]

Philadelphia Alumni Award. Awarded to a technology education major who demonstrates the best qualities of a technology teacher. [Applied Engineering, Safety & Technology]

Polymer Education Undergraduate Award. Awarded to a sophomore/junior-level chemistry major who has a minimum GPA of 3.5 and who has earned an "A" in each semester of the two-semester organic chemistry course sequence. [Chemistry]

Psychology Club Award. Awarded to a senior psychology major for outstanding interest in and enthusiasm for psychology, service to the department and scholarship as evidenced by a GPA of at least 3.0. [Psychology]

Psychology Faculty Awards. Established by the psychology faculty and awarded to outstanding junior and senior psychology majors. [Psychology]

Keith Ranck/Ralph and Judy Anttonen/WIXQ Award. Awarded to a student who is a member of the WIXQ Executive or Station Council and who has worked at WIXQ for at least two semesters. The recipient will be selected by a committee, including the WIXQ staff advisor, a member of the Student Affairs staff, two graduating senior students from WIXQ and a WIXQ alumnus. The award is not renewable. [WIXQ]

Margie L. Ranck Award. Awarded to a student who has completed the junior year on the basis of outstanding intellectual attainment, good character and an interest in Bible study. [Honors and Awards Committee]

Dr. Gary W. and Jacqueline Reighard Award for Outstanding Leadership. Awarded to a student for outstanding leadership who has completed at least 60 credits and who possesses at least a 2.75 GPA. Selection is based upon past contributions to Millersville University and potential for future development as a leader. [Student Affairs]

Robertson Library Garden Botany Internship. Awarded to a rising sophomore, junior or senior with a CGPA of 2.5 or greater, with first preference to biology majors with a botany option, who must demonstrate an interest in pursuing advanced study or a career in horticulture, horticultural taxonomy, landscape design or other related disciplines in botany, and will be the student deemed most capable of completing a successful project in a timely manner. The internship is not renewable. [Biology]

Henry J. Rutherford Memorial Award. Awarded to a junior or senior who has been constructively involved in environmental action and environmental enrichment activities. [Priority Club Advisor]

***Michael Scott Sawicki Memorial Award.** Awarded to an incoming or present student at Millersville who engages in community service. Selected students must have a GPA of at least 2.5, with first preference to a Lancaster Catholic High School graduate. [Financial Aid]

Irene P. Seadle German Section Award. Awarded to a senior German major who has done excellent work in German studies and contributed significant service to the German section. [Foreign Languages]

Harold W. and Miriam W. Shaar String Award. Awarded to a sophomore or junior music education major who has demonstrated considerable progress in playing a string instrument, shown an interest in teaching string instruments and contributed to the musical enrichment of University musical organizations. [Music]

Social Work Faculty Award. Awarded to a senior social work major for academic excellence. [Social Work]

Social Work Organization Award. Awarded to a senior social work major for academic excellence and contributions to the Social Work Organization. [Social Work]

Society for the Advancement of Management Award. Presented by the Millersville student chapter of S.A.M. to a junior or senior who has maintained at least a 3.0 GPA and exhibited outstanding management potential through participation in co-curricular activities in business administration. [Management and Marketing]

Charles D. Spotts Naturalist-Humanist Award. Awarded to a student who has contributed most to the naturalist-humanist ethic. [Entomology Club Advisor]

Mary R. Slokum Sproul Prize. Awarded to a student for excellence in public speaking. [Communication & Theatre]

Starbrad Excellence in Science Award. Awarded to a student who is majoring in one of the sciences, with first preference to chemistry, and who is participating in an internship for which he or she is receiving no pay. [Experiential Learning & Career Management]

***Steinman Foundations/Intelligencer Printing Freshman Scholarship.** Awarded to a full-time freshman admitted into either the associate or baccalaureate degree program in industrial technology or technology education with a demonstrated interest in graphic communication. [Applied Engineering, Safety & Technology]

Steinman Foundations/Intelligencer Printing Upperclassman Scholarship. Awarded to a full-time junior or senior industrial technology-graphic communication or technology education major with a demonstrated performance in graphic communication and a 3.0 GPA in the major. [Applied Engineering, Safety & Technology]

J. Richard Steinmetz Technology Teaching Award. Awarded to a technology education senior who, in the judgment of the industry and technology faculty, has high potential to become a successful teacher as evidenced by outstanding performance in student teaching and excellence in professional technical areas. [Applied Engineering, Safety & Technology]

Mark Stine Scholastic Attainment Award. Awarded to a junior and a senior who have pursued higher education primarily on a part-time basis and who have had special family responsibilities, or who have overcome cultural challenges. Students admitted on nondegree status are eligible. [Honors and Awards Committee]

Anna Tunis Summy Print Award. Awarded for outstanding achievement by a student who has produced the best print in the art department's printmaking classes, as judged by a jury of art department faculty. [Art and Design]

Anna Tunis Summy Watercolor Award. Awarded to a student demonstrating special talents and contributions related to visual arts and specifically the watercolor medium. [Art & Design]

Ronald E. Sykes Artist-Teacher Award. Awarded to the art education student teacher who has achieved the highest GPA based on 30 or more Millersville art credits. [Art & Design]

William S. Trout Award for English Education. Awarded to a senior English education major who has a cumulative GPA of 2.5 or greater, and 3.5 GPA in English courses. Candidates are required to document a commitment to creative writing through publication of original work (poetry, fiction and/or essay) in the George Street Carnival, *The Snapper*, literary journals, newspapers, magazines and/or participating in public poetry readings. In addition, the recipient must document a commitment to community service through activities such as working with Poetry Pathways or in-school programs, tutoring K-12 students, practicum internships or volunteering with such organizations as the Lancaster Literary Guild, local/regional poetry groups or in educational programs for senior citizens. Membership in the University English Club is preferred. An application and letters of recommendation are required, including from the student's cooperating teacher and/or University supervisor of student teaching. [English]

***Gail and Kenneth Twiford Biology Award.** Awarded to a full-time student majoring in biology who has a 2.75 or greater GPA and financial need. If awarded to a freshman, the recipient must be in the top 15% of his/her high school class. The award is renewable, provided the recipient continues to be a biology major, sustains a GPA of 2.75 or greater and continues to have financial need. [Biology]

Cecil M. Upton Organic Chemistry Award. Awarded to the outstanding student in the organic chemistry course sequence. [Chemistry]

John A. Van Horn Memorial Award for Applied Physics. A book to a senior physics major who demonstrates outstanding ability in applied physics. [Physics]

Louis Vyner Performance Award. Awarded to a full-time music major, selected by an audition committee of the music department on the basis of outstanding performance in the field of music and demonstrated academic excellence. [Music]

Steven A. Walker Memorial Award. Awarded to one or more junior or senior Spanish majors who have done excellent work in Spanish studies and contributed significantly to the Spanish Club. [Foreign Languages]

Wentzel-Wright Memorial Award. Awarded to a student at the end of the junior year, payable upon enrollment for the second semester of the senior year, on the basis of financial need, industry, service to the University community, participation in campus activities, scholarship, good character, integrity, honesty and professionalism. [Honors and Awards Committee]

Wickersham-Burrowes Fund for Excellence in the Arts. Awarded to a student or students in the arts, with first preference to provide non-tuition assistance for examples that may include, but again are not limited to, travel expenses for national or international study abroad, instrument rental or purchase fees, and art supplies. Remaining funds may be used to provide scholarship assistance to students with financial need majoring in the arts. An application is required. Funding support is renewable (for a maximum of three years), but an application is required each year. [Director of Ware Center]

Ruth Fox Wilkinson Award. Awarded to a graduating senior who has attained the highest average in early childhood or middle-level education courses. [Early, Middle & Exceptional Education]

WIXQ Service Award. Awarded for outstanding service to the University radio station. [WIXQ]

Edna Rochow Workman Memorial Award. Awarded to a junior or senior art major who has produced the best painting in oil or related media during the academic year. [Art & Design]

Xenophile-Theodore H. Rupp Foreign Language Award. Awarded to a senior for excellence in foreign languages. [Foreign Languages]



ACADEMIC REQUIREMENTS, OPPORTUNITIES AND POLICIES

ACADEMIC REQUIREMENTS

THE BACCALAUREATE CURRICULUM

Millersville University's baccalaureate-degree programs have four common curricular elements:

1. Proficiency requirements in English composition and mathematics.
2. The general education program, which constitutes about half of the curriculum (48 of the 120 minimum credits required for graduation).
3. The major program, which usually constitutes most of the other half of the curriculum.
4. Electives courses, if needed, to meet the minimum of 120 credits required for graduation. (A few programs require more than 120 credits for graduation.) Students may combine elective and general education courses to complete a minor.

Within each of these components, students have many choices in developing programs of study. They have a challenging and responsible role in planning the substance of their program.

Students are reminded that a full-time semester course load consists of 12 credit hours. However, it is necessary to average at least 15 credit hours each semester in order to graduate in four years (eight semesters).

Final responsibility for each student's program rests with the student. The role of the advisor is just that—to advise. Students are expected to familiarize themselves thoroughly with program requirements for their major described in this catalog, the Curriculum Record Form and the computerized degree audit. This computerized audit report is available to help students monitor progress toward completion of their major, minor and general education requirements.

PROFICIENCY REQUIREMENTS

MATHEMATICS

1. All undergraduate students must demonstrate minimum levels of proficiency in mathematics.
 - a. All entering undergraduate students are required to take part in the mathematics placement process.
 - b. The mathematics department determines the test(s) and the criteria for course placement.
2. Students placed in a developmental mathematics course are required to enroll in that course. Such students must demonstrate proficiency by satisfactorily completing the course with a grade of C- or above prior to taking any mathematics course at the 100 level or higher.
3. Students who must take developmental mathematics earn course credits, and the grade is counted in the cumulative grade point average, but developmental course credit cannot be counted towards fulfillment of the general education or graduation requirements for the baccalaureate or associate degree.

ENGLISH

1. All undergraduate students must demonstrate minimum levels of proficiency in English composition.
 - a. All entering undergraduate students who have not completed ENGL 110: English Composition or the equivalent, earning a C- grade or higher, are required to take an English composition placement diagnostic test.
 - b. The English department determines the test(s) and the criteria for course placement.
2. Students placed in a developmental English course are required to enroll in that course. Such students must demonstrate proficiency by satisfactorily completing the course with a grade of C- or above prior to taking any English course at the 100 level or higher.
3. Students who must take developmental English earn course credits, and the grade is counted in the cumulative grade point average, but developmental course credit cannot be counted toward fulfillment of the general education or graduation requirements for the baccalaureate or associate degree.

THE GENERAL EDUCATION PROGRAM

Consistent with Millersville University's mission to provide a liberal arts—based education, the purpose of general education is to provide breadth of knowledge as a balance and complement to the depth provided by the major. This is necessary for the holistic development of Millersville graduates as responsible citizens in a diverse and technologically complex global community.

General Education Objectives. Students, working with advisors, and taking into consideration prior knowledge and experience, purposefully select courses in the general education curriculum that meld with required courses, co-curricular and extracurricular activities, and courses in the major to achieve the following objectives:

FOUNDATIONS FOR LIFELONG LEARNING

1. Students will think, speak and write clearly. This is evidenced by:
 - a. the clear presentation of ideas in formal spoken, written and media forms.
 - b. the use of effective communication for ongoing dialogue.
 - c. the ability to find appropriate sources of information, evaluate that information and integrate that information into a final product.
 - d. the use of statistical methods and other techniques of mathematics to analyze and solve problems.

CRITICAL THINKING ACROSS THE LIBERAL ARTS

2. Students will demonstrate foundational knowledge of the important ideas and methods of different ways of knowing as follows:
- Courses in the arts and humanities challenge students to examine, analyze and critically evaluate artifacts of the human intellect and imagination to illuminate the complexity of the human experience. Through exposure to multiple voices, insights, objects and other creative works, students explore and interpret questions of meaning, fact and value. Ultimately, this engagement expands knowledge, deepens empathy and encourages collaboration between diverse individuals and communities.
 - Courses in the sciences and mathematics develop students' understanding and knowledge of scientific and mathematical reasoning and of strategies for logical problem solving. Students are challenged to recognize that scientific explanations offer falsifiable predictions, that claims must be supported by evidence and logical reasoning, and that the nature of scientific discovery and knowledge is fluid. Courses emphasize that the scientific meaning of fact, theory and law are not a hierarchy, and give students an appreciation of essential creative aspects of scientific process and discovery.
 - Courses in the social sciences focus on the intricate relationship between human behavior and social institutions. Through qualitative and/or quantitative methods of inquiry, students discover and ascertain how human beings behave and are expected to behave, within certain contexts. This interaction allows students to comprehend and articulate the relationship between behavior and context across people, cultures, time and place.

CONNECTIONS AND EXPLORATION

3. Students will connect important ideas and methods of inquiry from different disciplines as a means of becoming holistic and responsible citizens in a diverse and technologically complex global community. Students will:
- demonstrate civic and social responsibility.
 - grow in their engagement with peoples of diverse histories and communities, both inside and outside the United States.
 - build the foundation for a lifelong process of understanding, developing and monitoring healthy lifestyle behaviors in all dimensions of wellness, including physical, social, emotional, intellectual, spiritual and environmental wellness.
 - gain personal enrichment by developing new interests that can be enjoyed throughout a lifetime.

To meet these objectives, the general education program is organized into a structure with three components: Foundations for Lifelong Learning, Critical Thinking Across the Liberal Arts, and Connections and Exploration.

GENERAL EDUCATION STRUCTURE (minimum 48 credits)

FOUNDATIONS FOR LIFELONG LEARNING COMPONENT

ENGL 110: English Composition (0-3 credits). This college-level competency requirement is in addition to the pre-college proficiency requirement described earlier. Competence in English composition must be demonstrated in one of the following ways before the junior year:

- Achieving a combined score of 1100 in the Verbal portion of the SAT and the SAT II English Writing Test.
- Achieving a score of 3 or higher in the Advanced Placement (AP) test in English Composition.
- Achieving a satisfactory score in the CLEP subject examination in English Composition.
- Passing the English Composition Competency Examination administered by the English department at the beginning of each fall and spring semester.
- Earning a grade of C- or higher in English Composition (ENGL 110).

COMM 100: Fundamentals of Speech (3 credits). College-level competency in speech must be demonstrated in one of the following ways, preferably before the junior year:

- Earning a grade of C- or higher in a competency examination administered by the Communication & Theatre department. To take this examination, register with the Communication & Theatre department by the end of the drop/add period.
- Earning a grade of C- or higher in Fundamentals of Speech (COMM 100).

Approved MATH Course (3-4 credits). To develop mathematical reasoning ability, at least one approved general education math course must be successfully completed.

Advanced Writing (3 credits). A course to further enhance writing skills. The courses currently approved to meet this requirement are ENGL 311, ENGL 312, ENGL 313 and ENGL 316. Some departmental honors theses (HNRS 499) are approved to meet this requirement. Some majors require a specific Advanced Writing course. Students should consult the appropriate curriculum sheet and their academic advisors before choosing a particular Advanced Writing course.

CRITICAL THINKING ACROSS THE LIBERAL ARTS COMPONENT (9 courses – minimum 27 credits)

Three courses (minimum 9 credits) each in Humanities and Fine Arts (G1), Science and Mathematics (G2) and Social Sciences (G3). In Science and Mathematics, two of the three courses must come from Biology, Chemistry, Earth Sciences, and/or Physics, including one which has a Laboratory (L) component.

No more than two courses within each Liberal Arts area may be from a single department. Additionally, at least three courses taken throughout the three Liberal Arts areas must be at the 200 level or above.

Up to six courses required for the major from departments outside the major may be credited toward the Liberal Arts Component, but courses taught by the student's major department may not be credited here.

CONNECTIONS AND EXPLORATION COMPONENT

A total of 9 credits from the following areas are required to complete the Connections and Exploration Component.

Approved Wellness course (3 credits). The Wellness requirement is designed to assist students in making positive lifestyle changes that reduce their health risks, modify their consumer behavior and enhance their personal well-being and productivity.

Perspectives course (3 credits). A major function of these courses is to apply analytical and critical thinking abilities in resolving major social, cultural, scientific/technological and/or aesthetic problems. They are interdisciplinary and/or multicultural in content and require a high level of educational maturity, knowledge and thinking. Perspectives courses encourage undergraduate students to make independent and responsible value judgments and decisions.

Perspectives courses integrate the knowledge acquired throughout the baccalaureate experience. For example, perspectives courses nurture and extend the basic communications skills developed in the Foundations for Lifelong Learning Component of general education. Moreover, perspectives courses demonstrate how different areas of knowledge gained in the Critical Thinking Across the Liberal Arts Component of general education are complementary.

The following stipulations apply to perspectives courses:

1. Prior to enrolling in a perspectives course, each student must have successfully completed English composition, fundamentals of speech and earned at least 60 credits (junior standing).
2. Student must satisfactorily complete one 3-credit perspectives course from a list of approved courses, which may be either in the major department or outside the major department.
3. No perspectives course may be counted within the Critical Thinking Across the Liberal Arts Component of general education.
4. Students who complete an academic fall or spring semester abroad as part of a baccalaureate degree will be considered to have fulfilled the perspectives requirement. International students studying at Millersville will also be considered to have fulfilled the perspectives requirement. This waiver does not cover credit hours. A student employing this waiver will be required to satisfy three credit hours of general education courses in lieu of the waived 3-credit perspectives course. This is in addition to any other Open Elective requirements of the student.

First Year Inquiry seminar (0 or 3 credits). Incoming students are encouraged to take a First Year Inquiry (FYI) seminar, which will count as part of a Connections and Exploration Component. The FYI seminar is a component of general education specifically designed for first-semester freshmen and offered in a seminar format, typically linked to a foundations course (either ENGL 110 or COMM 100) as part of a learning community.

A major function of these FYI seminars is to introduce a process of critical inquiry applied to important social, cultural, scientific, technological and/or aesthetic problems. Each FYI seminar will introduce multiple perspectives related to the understanding and resolution of these problems. A second function of these FYI seminars is to support students' transition into the college experience academically, socially and personally. For those students who do not complete a FYI course, an additional open elective would be completed to satisfy the overall 12 credits required for the Connections and Exploration Component.

ADDITIONAL REQUIREMENTS

Cultural Diversity and Community: Each student must satisfactorily complete one 3-credit cultural diversity and community course from a list of approved courses. This course may also count as any additional requirements (major, minor or general education) of the baccalaureate degree. Cultural Diversity and Community is a requirement of the Connections and Exploration Component of general education. This requirement aligns general education with the University's mission to foster in students an appreciation for cultural diversity. Here, "cultural diversity" refers to the differences among people in terms of beliefs, customs, values, politics and experiences. In essence, culture is a worldview; it is both learned and evolved. The following factors are seen as underlying these differences: age, economics, education, gender, geography, language, nationality, occupation, physical ability, race and ethnicity, religious affiliation and/or sexual orientation, among others. A Cultural Diversity and Community course is more than a mere survey or exposure of the students to different cultures; rather, it teaches students to think critically about the basis for intercultural differences.

Writing: These courses ensure that undergraduate students have the opportunity to develop competence and confidence in their writing skills. The English 110 competency must be satisfied prior to enrollment in "W" courses. Each student must satisfactorily complete three 3-credit courses from a list of approved courses. These courses may also count as any additional requirements (major, minor or general education) of the baccalaureate degree.

COURSES APPROVED TO SATISFY GENERAL EDUCATION REQUIREMENTS

Lists of courses that may be credited toward each of the general education requirements are available from the academic advisement office, the academic advisement web page and the web class schedule.

THE MAJOR PROGRAM

After general education, the second component of a high-quality university education is an in-depth understanding of an academic discipline. Millersville currently offers 51 major fields of study within its bachelor's degree programs. Many majors offer options for fulfilling requirements that provide even greater choice in selecting a field of study. Students enrolled in programs that require more than 120 credits may need more than the traditional four years to complete their studies.

A list of Millersville's major programs and options and the specific course requirements for each is given in the *Academic Programs* section. Curriculum Record Forms have also been developed for each major and option to summarize the requirements and provide an informal record of student progress. They are available from department offices, through the Office of Academic Advisement or through Millersville's website. In addition, degree audit reports summarizing the status of a student's degree requirements are available on the University website through our Millersville Access System (MAX).

DECLARING OR CHANGING A MAJOR

To declare or change a major or an option within a major, contact the Office of Academic Advisement, Lyle Hall, for an appropriate form, or online at the Millersville University website, Student Forms Center. Some departments have specific requirements for admission to their major programs. Students must meet the major program requirements in effect at the time they declare or change their major. Students in undecided major status, with at least 45 credits passed, should refer to the *Undecided Major Status* section for specific academic requirements.

DEPARTMENT EVALUATION OF MAJORS

Students are subject to the approval of their major department for continuation in their major program. Departments may establish additional requirements for continuation in the major, review student credentials at the end of any semester and deny continuation in the major to any student they feel is not making satisfactory progress. Students who have been denied continuation in the major may appeal to the school dean and then to the Academic Standards Committee for reconsideration.

SECOND MAJORS

In some programs, through careful selection of elective courses, it is possible to complete the requirements for a second major. Upon certification by each major department that requirements have been satisfied, both majors are recorded on the student's records.

MINORS

Students who wish to become proficient in a second discipline may complete the requirements for a minor. Each minor requires a minimum of 18 credits. A GPA of at least 2.0 must be earned in Millersville courses required for the minor. Half of the minor must be completed at Millersville, only one course may count toward both a major and a minor, and no student may minor in his or her major. A list of minor programs and specific course requirements for each are given in the *Academic Programs* section.

To declare or change a minor, obtain an appropriate form from the Office of Academic Advisement or through the University website, Student Forms Center.

THE ASSOCIATE DEGREE CURRICULUM

Millersville's associate degree programs are career-oriented for students with specific occupational objectives. They consist of 60 to 65 credits of study. The programs normally have three components: communication skills; general knowledge of the natural sciences, social sciences and humanities; and an area of concentration. Approximately half the course work is in communication skills and general education; the other half is in the area of concentration. For more information, see the *Academic Programs* section.

OTHER CURRICULAR POLICIES

ADDITIONAL DEGREE REQUIREMENTS

To earn an undergraduate degree at Millersville University, a student must meet the following requirements:

1. All curricular and proficiency requirements as described above must be met.
2. A minimum of 120 credits must be completed for a bachelor's degree.
3. A GPA of at least 2.0 must be earned in Millersville courses.
4. A GPA of 3.0 must be earned in Millersville courses to meet entrance and exit requirements for a Bachelor of Science of Education (B.S.Ed.) degree.
5. A GPA of at least 2.0 must be earned in Millersville courses required for the major (area of concentration for associate degrees).
6. A GPA of at least 2.0 must be earned in Millersville courses required for the minor.
7. At least 30 credits (in addition to student teaching) of the last 45 credits must be completed at Millersville. Participation in approved Millersville University exchanges or attendance at programs consistent with Millersville University academic agreements will satisfy this requirement.
8. At least half of the major requirements must be completed at Millersville.
9. At least half of the minor requirements must be completed at Millersville.
10. Students who graduate with a B.S.Ed. degree or complete an approved program of post-baccalaureate studies for teaching certification must be admitted to Advanced Professional Studies. They must also meet the Pennsylvania state requirements and other Pennsylvania certification requirements, such as passing the required Praxis exams, to qualify for Pennsylvania teacher certification.
11. An Application for Degree form should be submitted before the end of the third week of the term in which the student expects to graduate. The University confers degrees six times annually: at the conclusion of the fall semester, winter session, spring semester, first summer session, second summer session and third summer session. Application forms are available from the registrar's office, Lyle Hall, or www.millersville.edu/commencement.

ADMISSION TO ADVANCED PROFESSIONAL STUDIES AND CERTIFICATION (EDUCATION MAJORS)

All students enrolled in teacher preparation programs must be admitted to Advanced Professional Studies and meet Pennsylvania state requirements and University requirements prior to being enrolled in their initial Advanced Professional Studies course. Students must meet additional Pennsylvania state requirements in order to be certified. A listing of Advanced Professional Studies courses and requirements is available in the Office of Field Services and on the Certification Office website.

EARNING A SECOND DEGREE

While it is possible for a student to satisfy the course requirements for two different degrees (e.g., B.A. and B.S.Ed.) simultaneously, only one degree will be awarded. The student chooses the degree to be awarded. A student who is progressing toward, or holds, a bachelor's degree will not be awarded an associate degree in the same discipline.

A student may earn a second associate or bachelor's degree at a later time by meeting the following requirements:

1. A minimum of 30 additional credits must be completed at Millersville at the undergraduate level following the award of the first degree. These credits must be in the major and required related fields.
2. All requirements for the major of the second degree must be satisfied.
3. Coursework completed as part of the first degree program may be used to satisfy the related coursework requirement in the second degree.
4. Coursework completed as part of the first degree program may be used to satisfy up to half of the second degree's major. If a course required in the second degree's major was completed as part of the first degree, it may not be repeated.
5. Teacher certification credits may not be counted toward a second degree.
6. When there is overlap in the majors of the first and second degrees, the 50 percent limitation in requirement 4 above and the limited course offerings in some departments may preclude the pursuit of a second degree.

SPECIAL ACADEMIC OPPORTUNITIES

HONORS COLLEGE AND DEPARTMENTAL HONORS

Millersville University offers a number of programs to help exceptionally talented students develop their potential. Students who complete the programs earn special recognition.

UNIVERSITY HONORS COLLEGE

The University Honors College challenges talented students while encouraging them to develop their intellectual potential. The program introduces students to the main currents of world thought and culture, and develops writing, research and analytical skills. Enrollments in honors classes are limited to facilitate student-faculty interaction. Students who successfully complete the program are awarded the University Honors baccalaureate at graduation.

Invitations to the program are extended to entering freshmen who have combined SAT I scores of 1200 or above and are in the top 10 percent of their high school class. Other interested freshmen and currently enrolled students with cumulative grade point averages (CGPAs) of at least 3.35 are encouraged to apply for admission to the director of the University Honors College.

To remain in good standing in the Honors College, students must maintain a GPA of at least 3.20. University Honors College students who achieve a final overall GPA of 3.8 or higher will graduate from the University Honors College "With Distinction."

To receive the University Honors baccalaureate, students must:

1. Earn a cumulative GPA of at least 3.20.
2. Earn a minimum of 30 honors credits and fulfill the Honors College curricular requirements. Honors credit is awarded only for those honors courses in which a B- or higher is earned.
3. Maintain a GPA of 3.35 in all Honors coursework.
4. Students must complete and successfully defend an honors thesis.
5. With proper approval, an Honors College student may enroll in up to two courses (maximum of 6 or 8 credits, depending on the major) in their department major and earn Honors credit. Only courses at the 200 level or above will be considered appropriate. Students must have already earned a minimum of 15 credit hours with honors designation.

For more information, contact the director of the Honors College, and see the *Undergraduate Programs of Study* section.

DEPARTMENTAL HONORS

This program provides an opportunity for superior and highly motivated students to pursue a specialized area of interest intensively and independently. Upon successful completion of the program, students are recognized for their achievements at graduation with the designation of Departmental Honors on their diploma and University record.

To be eligible for the program, students must have a cumulative GPA of at least 3.0 and the endorsement of the department.

The program generally consists of two to four semesters of supervised tutorial work, reading, self-instruction, creative inquiry and research, which culminates in the production of a thesis or project. One to four credits may be earned for each of the departmental

honors courses (see specific departments' requirements). Grades in these courses are determined by the faculty supervisor and departmental committee.

Final theses or projects are examined by and orally defended before the departmental committee. Grades of B- or higher must be earned on them. They are then presented to the Honors and Awards Committee for review. Titles of completed works are published in the commencement program. Contact the department office for an application and more information.

HONORS COURSES

Honors courses offer special academic challenges and opportunities for intellectual inquiry. These courses require a measure of independent reading, thinking and questioning. Students are expected to assume a greater portion of the responsibility for learning. Course requirements include activities to develop writing, research and analytical skills.

Honors courses are open to students in the University Honors College, students with a cumulative GPA of at least 3.35 and other students with permission from the instructor. A grade of B- or higher must be earned to qualify for the honors designation on the student's record.

ON-CAMPUS ACADEMIC OPPORTUNITIES

WINTER SESSION

Winter session allows students to complete additional courses between the fall and spring semesters. Courses are open to students from other institutions of higher education as well as Millersville students. Residence halls and dining facilities are closed during winter session. For more information about winter session, call the registrar's office at (717) 871-5005, the CGSAL office at (717) 872-3099, or check the University website.

INDEPENDENT STUDY

Independent study allows students to pursue, with faculty supervision and guidance, an academic area of interest not available through an established course. To apply, students must complete a special studies assignment form, available in department offices and in the online Student Forms Center, and obtain approval for the proposed topic and faculty supervisor from the department chairperson and school dean before the start of the term.

INDIVIDUALIZED INSTRUCTION

Individualized instruction allows students to complete an established course during a semester in which it is not offered. Approval to pursue a course through individualized instruction is granted only under special circumstances. To apply, students must complete a special studies assignment form, available in department offices and in the online Student Forms Center, and obtain approval for the proposed topic and faculty supervisor from the department chairperson and school dean before the start of the term.

COURSE SCHEDULING PREFERENCE FOR VETERAN STUDENTS

Act 46 of 2014 requires public institutions of higher education in Pennsylvania to provide veteran students, as defined in the Act, with preference in course scheduling. Noncompliance may be reported to the Pennsylvania Department of Education by submitting the Higher Education Student Complaint form found at www.education.state.pa.us. In accordance with Act 46 of 2014, Millersville University provides early registration priority for enrolled students identified as veterans who meet the following criteria: 1. Has served in the United States Armed Forces, including a reserve component and National Guard, and was discharged or released from service under conditions other than dishonorable; 2. admitted to Millersville University for the current academic year; 3. reside in Pennsylvania while enrolled. Students who have identified themselves as being veterans, as defined above, will automatically receive their priority registration date and time in their MAX account. Students who believe they are veterans as defined above and who have not yet identified themselves as such should submit a DD214, Joint Services Transcript (JST) or Community College of the Air Force (CCAF) transcript to the Transfer Credit Coordinator, Room 242, Lyle Hall. The Financial Aid Scholarship and Veterans Coordinator will provide to the Registrar's Office the names of the students meeting these criteria prior to the posted priority registration date. Students who are given Course Scheduling Priority privileges are permitted to enroll in courses two days prior to the regular scheduling timetable as defined by the Office of the Registrar. Students with questions concerning course scheduling preference for veterans may contact the following individuals: Ms. Giselle Fernandez (717-871-5100), Scholarship & Veterans Coordinator; Ms. Frances Axsmith (717-871-4625), Transfer Credit Coordinator

TAKING GRADUATE COURSES AS AN UNDERGRADUATE

Well-qualified Millersville University undergraduates may enroll in graduate courses for undergraduate or graduate credit. Specific conditions apply to each of these two credit alternatives.

Undergraduates may enroll in 500-level graduate courses for undergraduate credit with permission of the instructor and advisor. The credits earned count toward baccalaureate degree requirements and cannot be converted to graduate credits.

An undergraduate with a 3.0 GPA or higher may enroll in 500- and 600-level graduate courses for graduate credit. The student must have a maximum of 15 semester hours to be completed in the baccalaureate degree program. Written permission must be acquired from the advisor, the course instructor, the graduate program coordinator and/or chair of the department offering the course, and the dean of graduate studies. The undergraduate will also need to be admitted as a nondegree graduate student.

A maximum of nine graduate credits may be earned by an undergraduate. These credits may not count toward the completion of the student's baccalaureate degree.

PASS-FAIL OPTION AND AUDITING COURSES

The pass-fail option provides students the opportunity to pursue a course without the usual pressure of earning a grade.

Auditing a course allows a student to attend classes and participate in discussions without the pressures of taking examinations, writing papers or fulfilling other requirements generally associated with earning credit. Students must submit requests to take a course on an audit or pass-fail basis by the end of the add period. See the *Grades & Policies* section for more information.

DEVELOPMENTAL COURSES

Course numbers beginning with a zero are pre-college developmental courses that provide opportunities for students to remediate academic skill weaknesses and develop basic proficiency. Placement in these courses is recommended, and under some circumstances required, following an assessment of the student's basic skills. For more information, see the section on *Proficiency Requirements*.

A grade of C- or higher is required to demonstrate proficiency in a developmental course. Students who must take a developmental course(s) earn course credits, and the grade is counted in the cumulative grade point average, but developmental course credit cannot be counted towards fulfillment of the general education or graduation requirements for the baccalaureate or associate degree.

UNDECIDED MAJOR STATUS

Students may seek admission to Millersville without selecting a major. Special academic advisors are assigned to guide undecided students through the general education requirements and assist them in exploring potential majors through the Exploratory Program. Students who qualify for admission to Millersville, but do not meet admission criteria for a selected major, are classified as undecided until they qualify for study in the major of their choice.

Students with at least 45 credits passed and in undecided status, or changing to undecided status, must either:

1. Declare and be accepted into a major.
2. Complete a review of academic goals as follows: the student, in consultation with an assigned advisor, must propose and have approved by the advisor each semester an academic plan of action that includes a realistic timeline for the completion of degree requirements. The approval form will indicate whether the student is waiting to get into a major and, if so, the reason for nonacceptance into that major. A copy will be filed in the registrar's office.
3. Sign a statement which indicates awareness of the ramifications of remaining in an undecided status but may choose to continue to remain in that status.

Permission to register will be granted only if one of the above requirements is completed.

OFF-CAMPUS ACADEMIC OPPORTUNITIES

COOPERATIVE EDUCATION/INTERNSHIP

Cooperative Education (Co-op) and internships (see Internships) are optional credit-bearing learning experiences that take place in a work setting rather than in a classroom. Co-op and internships are the result of partnerships between the University and employers in business, industry, government and human services. The program is flexible, allowing students to work full-time or part-time. They may work locally, nationally or internationally.

As a result of this program, students in any major can receive work experience, earn income and apply learned theories. A cooperative education experience also provides the opportunity for students to gain greater insight into their chosen career, either strengthening or redirecting their career choice.

Sophomores, juniors and seniors are highly encouraged to take the first steps to find out more about this program by completing an online orientation found at www.millersville.edu/elcm/internships.

At the discretion of the department, a minimum of 3 s.h. up to a maximum of 12 s.h. may be counted in the major or as electives toward normal graduation requirements. Additional credits will be counted over and above the normal graduation requirements. Students may participate in a maximum of four cooperative experiences. As with any course, there are academic requirements as well as appropriate tuition for each experience.

The cooperative education program is optional for most Millersville majors. Students must, however, meet the following criteria for participation:

1. Be enrolled in a degree program at Millersville University.
2. Have successfully completed at least 24 college credits (transfer and second-degree students must successfully complete 12 credits at Millersville).
3. Have a GPA of at least 2.0 (individual departments may stipulate higher GPA requirements).
4. Have approval from the appropriate academic department to participate.

For more information, contact Experiential Learning and Career Management, or go to www.millersville.edu/elcm/internships.

GRADUATE AND UNDERGRADUATE COURSES

Credit-bearing courses are scheduled at off-campus sites as a convenience to part-time students and working adult students. Graduate courses for teachers are available most semesters online, at schools in local school districts and/or at off-campus locations in Lancaster and Harrisburg.

Undergraduate courses are offered each semester at several sites in central Pennsylvania. Students enrolled in off-campus sites are welcome and encouraged to use campus facilities and services. For information about off-campus courses, contact the CGSAL, 717-871-4723.

NONCREDIT COURSES

The Corporate University and Nonprofit Resource Network at Millersville provide customized and training solutions to businesses and community or nonprofit organizations. For information, contact The Corporate University, with offices conveniently located in Millersville and Harrisburg, 717-871-7171, or corpu@millersville.edu, or the Nonprofit Resource Network, 717-871-7178, or info@nonprofitresourcenetwork.org.

STUDY ABROAD

Study abroad can be a valuable and important part of a student's undergraduate education. Regardless of a student's major, learning firsthand about another way of life and seeing the world from another culture's perspective are invaluable assets for success in our global society.

Millersville University students may study abroad in nearly every country worldwide for a summer, a semester or an academic year. Although most students who study abroad choose to do so during their junior year, students may study and/or do an internship abroad for University credit any time after completing 24 academic credits. International internships for most majors/minors, student teaching abroad and international social work placements are also available.

Whether fluent in foreign languages or only in English, students may participate in study abroad through Millersville's own international partners, through other accredited U.S. institutions' programs or directly through many international universities. Millersville offers its own study/intern-abroad programs with University of the Sunshine Coast in Maroochydore, Australia; Pontificia Universidad Católica de Valparaíso in Valparaíso, Chile; Jiangxi University of Finance and Economics in Jiangxi, China; American Business School Paris in Paris, France; Université de Caen Basse-Normandie in Caen, France; Philipps-Universität Marburg in Marburg, Germany; Kansai Gaidai University in Osaka, Japan; Volunteer Adventure Corps in Cape Town, South Africa; University of KwaZulu-Natal in Durban, South Africa; Universidad de Burgos in Burgos, Spain; Universidad Pública de Navarra in Pamplona, Spain; London Metropolitan University in London, United Kingdom; University of Strathclyde in Glasgow, Scotland, U.K.; and Queen's University Belfast in Belfast, Northern Ireland, U.K.

To be eligible for any study-abroad experience, students must have completed at least 24 college credits, maintained a minimum cumulative 2.0 GPA prior to departure (individual programs may have higher requirements) and received advance approval from the Office of Global Education and Partnerships.

For more information about study abroad, contact Ms. Olivia Cardero, Assistant Director of Global Education and Partnership, Cumberland House, (717) 871-7506, or email globaleducation@millersville.edu.

PASSHE VISITING STUDENTS

The purpose of the PASSHE Visiting Student program is to facilitate student enrollment at institutions of Pennsylvania's State System of Higher Education and to enable students to take advantage of courses available across the System, without loss of institutional residency, eligibility for honors or athletics, or credits toward graduation at the home institution.

The student must be matriculated at the home university with a minimum of 12 college-level credits and be in good academic standing. Students may take a maximum of 24 credits via the Visiting Student Policy.

The student who presents evidence of good standing at the home university will be allowed to register for courses at other PASSHE universities. The visiting student priority level for registration will be determined by each university.

All credits and grades accrued at other PASSHE universities shall be accepted in full by the home university and thereafter treated as home university credits, residency and grades.

It is the responsibility of the student to work with the student's advisor at the home institution regarding applicability of credits toward graduation requirements at the home institution consistent with PASSHE procedures, and to complete the Visiting Student Notification Form and submit it to the home institution prior to enrolling in courses at another PASSHE institution.

Students cannot use the Visiting Student Program to repeat courses.

Students cannot use the Visiting Student Program for internship or practica that are required for licensure or certification without the express written permission of their appropriate university officials at the home university, and placement availability at the requested institution.

The student shall register at, and pay tuition and fees to, the State System University visited. A student wishing to divide a course load between two institutions during the same term shall register and pay appropriate tuition and fees at both universities.

The Office of the Chancellor will work with universities to establish and publish procedures to identify visiting students such that financial aid, residency, eligibility for honors, eligibility of athletics and credits to graduation are assured.

The Visiting Student Form is available from the Registrar's Office.

STUDY AT OTHER INSTITUTIONS

Millersville students may take courses at other colleges and universities for transfer back to Millersville. Many students, for example, take summer courses at a college near their home. Students must obtain approval in advance from their advisor, the department chairperson and the registrar. Authorization for Transfer of Credit forms are available in the registrar's office or on the Millersville website located under the Student Forms Center. For more information, see the *Transfer Credit* section.

Exchange Agreement with Franklin & Marshall College. Through this exchange agreement, full-time Millersville students may, with approval, pursue courses not available at Millersville at Franklin & Marshall College. No tuition is charged by Franklin & Marshall College. This agreement does not include courses offered during the summer or winter at Franklin & Marshall. See the approval form, available in the registrar's office, for additional requirements.

Exchange Agreement with Lancaster Theological Seminary. Through this exchange agreement, full-time Millersville students who qualify for admission to graduate-level courses may, with approval, pursue courses not available at Millersville at Lancaster Theological Seminary. No tuition is charged by the seminary.

3-2 Cooperative Programs in Engineering. Physics-engineering and chemistry-engineering majors are offered in cooperation with Pennsylvania State University. In addition, the physics department has an engineering program with the University of Southern California. These programs require three years of study at Millersville, with a major in physics or chemistry, and two years in residence in the engineering program of one of the cooperating institutions. Interested students should contact the physics or chemistry department chairpersons for further information.

INTERNSHIPS

Internships provide students with the opportunity to gain professional experience in their chosen field before they graduate, and can be a valuable bridge between college and career. Millersville University offers a strong academic internship program that provides structure and awards academic credits. Students complete internships locally, regionally, nationally and internationally, in both paid and unpaid positions, in businesses, government and nonprofit organizations across a wide variety of academic and professional fields. The work experience is part of the total learning experience, which is supervised by a faculty member in the student's major. Students must have completed 24 credits, have at least a 2.0 GPA and a declared major or minor to be eligible. Individual departments may also establish additional criteria and requirements beyond the University minimum standards. Academic requirements to be completed during the internship include regular meetings with a faculty supervisor and completing an outcome paper. Students typically earn three credits, completing 225 hours over the course of a semester.

Internships at Millersville University are administered as an academic program through Experiential Learning and Career Management, located in Bedford House. Our students benefit from the collaboration between the faculty and the internship program staff in preparing, coordinating and supervising students completing an internship.

Specialized internship experiences are available through some academic departments, such as The Harrisburg Internship Semester (THIS). Sponsored by Pennsylvania's State System of Higher Education, this program offers a paid internship with policymakers in the state legislature, executive branch and other governmental agencies. For more information specifically about The Harrisburg Internship Semester, please contact the THIS Campus Coordinator—Millersville University. www.passhe.edu/inside/asa/opportunities/this or richard.glen@millersville.edu.

For more information about internship opportunities and the University's internship program, please contact Experiential Learning and Career Management in Bedford House, or visit the website at www.millersville.edu/elcm.

STUDENT TEACHING, EARLY FIELD EXPERIENCES AND CERTIFICATION

Undergraduate and graduate teaching experiences, including pre-student teaching (early field experiences), student teaching, internships and student teaching in international and Native American settings, are coordinated through the field services office.

EARLY FIELD EXPERIENCES

The University maintains a strong commitment to connecting theory and practice through early field experiences, prior to student teaching, in local school districts and childcare settings. Most early field experiences are integral parts of specific education courses, and students must successfully complete these experiences to be admitted to student teaching. Admission to Advanced Professional Studies is required for many of the courses that contain early field experiences. (Please consult the section on *Admission to Advanced Professional Studies*.) For the early field experiences available in your major, contact your department chairperson. Students need an Act 114 FBI clearance, Act 34 Criminal clearance and an Act 151 Child Abuse clearance that indicate "No record exists" for eligibility for placement in early field experiences. Students also need a negative TB test. All clearances and a TB test with negative results must be updated yearly and not expire during the early field experience semester. Each student in the course of their placement will have an urban experience.

STUDENT TEACHING

The University, working with school district administrators, will assign student-teaching placements. Student teachers may not approach or request a specific school or cooperating teacher. Student teachers are not assigned to the school district from which they graduated or in which family members are attending or employed. Students are responsible for their own transportation during student teaching.

For admission to the Millersville student-teaching program, the following policies apply:

1. Student must have earned at least 85 credits with a cumulative GPA and major GPA that meet University and state requirements prior to the student-teaching semester.
2. Students must have successfully completed all required professional education courses and early field experiences, and been admitted to Advanced Professional Studies (APS), having met all APS requirements.
3. Students must apply to the student-teaching office one full year prior to the semester in which they plan to student teach.
4. No student may student teach while on academic probation.

5. Students need an Act 34 Criminal clearance and an Act 151 Child Abuse clearance that indicate “No record exists” for placement in a student-teaching experience. As mandated by the state of Pennsylvania, students will also need an FBI criminal clearance that indicates “No record exists” for eligibility for placement in a student-teaching experience. Students also need a TB test. All clearances and a TB test with negative results must be updated and not expire during the student-teaching semester.

Millersville’s Professional Development School (PDS) is a full-year internship experience that immerses future teachers in a school setting. The senior-year apprenticeship with a master teacher allows selected teacher education students to shift their focus from simply learning about teaching to implementing their learning in the classroom to make a positive impact.

Throughout the year, Millersville teacher education students work in a nurturing environment with their mentor teachers to transition from students learning about teaching to career-ready teachers prepared to be in the classroom on their own. In their fall semesters, students take several classes where their work focuses on improving their classroom environments. This takes place in regional schools. In their spring semesters, students ideally co-teach the same class from the fall, completing the official student-teaching semester. This seamless integration between the theoretical aspects in the classroom and the practical implementation simultaneously occurring in the field creates student teachers able to navigate the ever-changing environments of education.

This award-winning Professional Development School model is recognized by the National Association of Professional Development Schools (NAPDS) for its excellence in training future teachers. In 2014 Millersville University won the Exemplary Professional Development School Achievement Award.

Millersville’s PDS model forges a mutually beneficial connection between the regional schools and the University through the close collaboration on this program. Millersville students benefit from this collaboration through extremely successful placement rates.

CERTIFICATION

Millersville University prepares students to be able to apply for the following certification areas in the state of Pennsylvania:

- Art
- Biology
- Chemistry
- Dual K-8 Special Education and PreK-Grade 4
- Dual 7-12 Special Education and BSE Subject Area
- Earth Science
- English
- French
- German
- Mathematics
- Middle Level
- Music
- Physics
- PreK-Grade 4
- Social Studies
- Spanish
- Technology Education

CHINCOTEAGUE BAY FIELD STATION OF THE MARINE SCIENCE CONSORTIUM

Millersville is a founding and senior full member of the Chincoteague Bay Field Station of the Marine Science Consortium, a nonprofit educational corporation comprised of regional universities and colleges that operate a marine station at Wallops Island, Virginia. The consortium has several seagoing vessels and laboratories with biological and oceanographic equipment. Newly constructed labs and living facilities for students and staff are provided at the station.

Four three-week sessions are offered at Wallops Island each summer. See the biology and earth sciences department listings for information on the Chincoteague Bay Field Station of the Marine Science Consortium and the many programs and courses offered there. For more information and to apply for courses, go to www.cbfieldstation.org, or contact the CST.

SPECIAL EVENTS

For more information on special events at Millersville, visit the University home page: www.millersville.edu.

SPECIAL FUNDS

The William W. Adams Endowment in support of the Aristides De Sousa Mendes Lecture. Used to support the Aristides De Sousa Mendes Lecture at the annual Holocaust Conference. In the event the Holocaust Conference is discontinued or suspended for more than one year, the interest earned from the endowment should be applied to studies of the Holocaust at the University.

Albert W. Bender Memorial Endowment. Used for acquisition of materials for the University library.

Benchmark Construction Company, Inc. Living-Learning Community Programming–South Quad Lobby Endowment. The income from the endowment will be used for programming within the Living-Learning Community, South Quad, Lobby.

Harold and Clara Brenner Memorial Endowment Fund. Used for acquisition of materials for the University library.

Robert V. and Virginia K. Brown Endowment for Health and Wellness. Income from the endowment will be used to support programming and other needs related to the promotion of health and wellness within the Center for Health Education and Promotion or its successor.

Class of 1938 Endowed Fund. Used in support of University projects as determined by the president of the University.

Class of 1939 Endowed Fund. Used in support of University projects as determined by the president of the University.

Class of 1949. Funds to be used for library acquisitions.

Class of 1950. Funds to be used for purchasing computers for classrooms and the library as determined by the president of the University or designee.

Class of 1953 Endowment. Income from the endowment is to be used at the discretion of the president of the University or designee.

Diana's Dreamers: Determined to Defeat Breast Cancer. Income from the endowment will be directed towards Millersville University's student health and wellness programming with a specific emphasis on breast health.

The Amy and Lee Dmitzak Honors College Endowment. To support programs associated with the Honors College, with first preference toward assisting with global initiatives. Funds will be used at the discretion of the Director of the Honors College in consultation with the University's president.

The Dr. Mary Elizabeth Dixon Endowment for Allied Health Professions. To be used for the acquisition of instructional equipment for Allied Health professions in the Department of Biology. Allocation of funds for specific equipment is to be determined by the chairperson of the biology department and the Allied Health Coordinator.

Susan C. and Gerald C. Eckert Service and Philanthropy Endowment Award. Income from the endowment will be directed to a University program in honor of the recipient and as directed by the award recipient.

Endowment for the Arts. To support equipment needs, renovations, maintenance and programs in the arts, including the Winter and Ware Centers.

Ermaleen B. Etter Faculty Research Award. Awarded to an education faculty member to conduct research contributing to professional and personal enhancement of professors instructing students with learning disabilities.

Mary Ross Ezzo. Funds to be used toward a literary lectureship.

Paul G. Fisher Endowment for a Symphonic Guest Artist. Funds are directed to the honoraria and expenses to bring distinguished symphonic band conductors or soloists to the University to perform primarily with the Millersville Symphonic Band.

Peter H. Freedman Jazz Concert Endowment. To fund an annual jazz concert.

Helen A. Ganser Endowment Fund. Used to purchase library materials.

Glenna M. Hazeltine Endowment. Used in support of a University conference, to be known as the Glenna M. Hazeltine Women in Mathematics and Science Conference.

William Randolph Hearst Foundation Endowment Fund. Funds support scholarships for the Lancaster Partnership Program.

Elsie Breckbill Hollinger Endowment for Library Acquisition. Used for acquisition of materials for the University library.

Eleanor Isaacson Lifetime Achievement in the Arts Award. The income from the endowment will be used to support the Isaacson artist-in-residence. Program expenses may include, but are not limited to, artist's fees, class materials, workshops, public presentations and associated events.

Ray W. Kauffman Endowment Fund. Funds honoraria and expenses to bring distinguished orchestral performers to the campus to perform with the Millersville Community Orchestra.

Esther Kilheffer Endowment in Earth Sciences. Used for the purchase of instructional equipment for the earth sciences department.

Harry D. Kilheffer Endowment. Used for acquisition of materials for the University library.

Richard '73 and Sally '72 Kuhnert Endowment for Mathematics. Used to provide funds to support department initiatives furthering the mission of the department. The usage shall be determined by the University president and/or his/her designee, typically the chair of the Department of Mathematics, in consultation with the dean of the CST.

Liddell Field Study Endowment. The income from the endowment will support academic field experiences for students at Wallops Island (or other similar field studies). The funds may be used at the dean's discretion for scholarships, research stipends or equipment to enrich the program.

Bruce R. Limpert Endowment. Income from the endowment will be used to support the Providence Project at Millersville University under the leadership of Dr. Marlene Arnold. The distribution of the funds will be made by the University president or his/her designee. Upon completion of the Providence Project, all remaining spendable income will be directed to the Entrepreneurship Program.

Frank S. Lisella Endowment for Biology Equipment. Funds to be used by the biology department to purchase equipment that will support the education of students.

Anna Funk Lockey Lectureship Endowment Fund. Funds support a lectureship in education.

Elsie McAuslan Library Endowment Fund. Used to purchase materials for the library.

William M. and Winifred Cooke McCain Endowment. Used for acquisition and restoration of material of historical value to the Millersville University Archives and Special Collections.

Mary McGrann Endowed Fund. Used to assist deaf or hearing-impaired students who, in the opinion of the selection committee, have demonstrated academic ability and financial need. Preference given to Lancaster County students.

The Melva S. McIlwaine Masterclass and Concert Endowment. Used to provide students of Millersville University with direct access to nationally and internationally recognized artists in vocal and instrumental music—classical, popular and jazz through master

classes and concerts, which will also benefit the community at large. A committee shall be appointed by the University president or her/his designee representing the major performing music areas—vocal, instrumental, keyboard, percussion—who shall select the artists for the featured events.

Paul J. McInerney Memorial Lecture Endowment Fund. Funds cover direct costs of invited distinguished guest lecturers, who will lecture within the physical sciences.

Meteorological Endowment. Established in memory of Dr. Russell DeSouza for equipment acquisition for the earth sciences department.

C. Maxwell Myers Endowed History Memorial Fund. Used to purchase library books for the history department.

Conrad Nelson Endowment in the Fine Arts. Income from the endowment will be used to fund an artist-in-residence program.

Joseph F. Noonan Memorial Academic Student Activities Endowment. The income from this endowment will be used to finance activities for students that will enhance their academic program. Funds to be awarded on proposals submitted to an All-college Committee established by the Vice President for Academic Affairs.

The Petras Endowment for Equipment. The income from the endowment will be used to purchase computer equipment for classrooms or the library.

Melzer R. Porter Memorial Library Fund. Used to purchase music literature for the music collection of the library.

Carl R. Rees Mathematics and Computer Science Fund. Used to advance faculty development in the mathematics and computer science departments.

The Robertson College of Science and Technology Instructorship Endowment. Awarded to untenured faculty in the College of Science and Technology for release from one course to pursue research. First preference will be faculty in their first year. If there is no new hire in a particular year, a one-course release time award may be granted to other faculty members with the following priority: faculty in their second year of tenure-track service, followed by those in their third year, followed by those in their fourth year. If no tenure-track faculty member is eligible in a particular year, the Instructorship will not be awarded and the spendable income will be returned to the endowment principal to enhance future earnings. Additionally, in any year in which a portion of the spendable income is unused, that portion will be returned to the principal as well.

College of Science and Technology Dean's Discretionary Endowment. Used to provide funds to be allocated flexibly to support school programs consistent with the mission of the School. The usage shall be determined by the University president and/or his/her designee, typically the dean of the College of Science and Technology. Funded by Richard '73 and Sally '72 Kuhnert.

Elsie S. Shenk Endowment. Used in support of the Wellness and Women's Center Program.

Jestina Stahl Endowment for Library Support. Funds are directed to the acquisition of materials for the library.

Samuel Bechtold Stayer and Caroline Nissley Stayer Endowment. Awarded to faculty within the College of Education and Human Services for activities which enhance both their professional development and the academic development of their students, and ensure that Millersville University maintains a leadership role for programs in education.

Carl Van Stephenson Memorial Library Fund. Used to purchase library books.

Susquehanna Bancshares Non-Profit Internship Program. The income from the endowment will be used to support the students and programs associated with the Susquehanna Bancshares Non-Profit Internship program. These costs include, but are not limited to, student stipends and program costs.

Richard Cecil Todd and Claudia Pennock Todd Athletic Endowment Fund. Used to develop and maintain an outstanding athletic program, including all men's and women's varsity sports. Only the men's varsity basketball program shall be excluded from this fund. It is recommended that funds be used for athletic scholarships, the strength-training facility, and sponsorship of and participation in appropriate tournaments.

Richard Cecil Todd and Claudia Pennock Todd Basketball Endowment Fund. Used to develop and maintain an outstanding men's varsity basketball program.

Richard Cecil Todd and Claudia Pennock Todd History Endowment Fund. Used for unrestricted purposes within the Department of History. The benefactor recommends the following to be considered: continued participation in the National History Day Project (or comparable project), undergraduate scholarships, lecture series, student retreats, departmental publications, special equipment or distinguished history chair.

Richard Cecil Todd and Claudia Pennock Todd Library Endowment Fund. Used to support the University library. The funds shall aid the University in its quest for excellence and shall be used to supplement and not replace regularly budgeted state funds for the library.

Richard Cecil Todd and Claudia Pennock Todd Presidential Endowment Fund. Used to benefit the University at large. The fund shall be unrestricted in nature.

Richard Cecil Todd and Claudia Pennock Todd Social and Cultural Growth Endowment Fund. Used to promote social and cultural programs at the University and to develop in students a thoughtful and well-informed attitude towards problems of current significance and towards that which is fine in music, art, literature and drama.

United Campus Ministry Endowment. Funds will support program/activity needs for United Campus Ministry (UCM).

Kay E. Vandergrift and Jane A. Hannigan Innovator-in-Residence Program Endowment. The income from the endowment will be used to support costs associated with the "Innovator-in-Residence" program. This program will bring an "innovator" to campus for up to three days to interact with the Millersville University community, including class presentations, workshops, public presentations and associated special events. Costs may include, but are not limited to, speaker honorariums, travel expenses and associated presentation materials.

Walter B. '42 and Betty Waetjen Global Opportunities Fund. Funds to support program needs associated with either education-abroad initiatives or on-campus internationalization efforts. Such needs can include, but are not limited to, expenses related to providing financial assistance for students to participate in study, internships, student teaching or research experiences abroad; hosting visiting faculty and students from abroad; program support for said students and faculty; and costs associated with establishing, promoting or monitoring student programs with international academic partner institutions.

Robert S. and Sue A. Walker Center for Civic Responsibility and Leadership Endowment. The income from the endowment will support the Walker Center for Civic Responsibility and Leadership programs: student-centered educational and developmental projects and activities.

The Ware Center Endowment. Funds to be used directly for annual operational support restricted to building maintenance and to program support for music and performing arts at the Ware Center at 42 N. Prince St., Lancaster, Pa., in perpetuity.

Donald E. Weiman Instructional Equipment Endowment. Award used to support the repair or purchase of equipment for the chemistry department.

Harold R. Weirich Memorial Lecture in Biology Endowment Fund. Funds support annual lecture in biology.

Women's Issues Endowment. Awarded annually to members of the University community for conducting or disseminating research or organizing programs that focus on issues of central concern to women.

Women's Studies Endowment. Awarded to support teaching, the conducting or dissemination of student or faculty research, or the organization of, or attendance at, programs focusing on issues of concern to the women's studies program.

David Zubatsky Endowment for International Studies. Used for acquisition of materials of value for the University library to establish a collection for international studies.

Dr. David S. and Marie N. Zubatsky International Studies Scholarship and 20th-Century Art Library Materials Fund. Used for acquisition of 20th-century art resources for the University library.

David S. Zubatsky Endowment for Judaic Studies. Used for acquisition of materials for the University library to establish a collection for Judaic studies.

ACADEMIC POLICIES

GRADING POLICIES

Each instructor establishes his or her own grading policy based on classroom participation, homework, unannounced quizzes, etc., and states it clearly and in writing at the beginning of the course. Sufficient measures are built into each course structure to evaluate student achievement.

Final examinations normally do not count as more than one-third of any student's final grade. Instructors may excuse any student with superior achievement (a grade higher than A-) from taking a final exam.

GRADES AND GRADE POINT SYSTEM

The grade point average (GPA) is a comprehensive evaluation of a student's academic standing. The grades and terms used to describe achievement are reported at the end of each semester as:

Grade	Description	Grade Point Value
A	Excellent	4.0
A-		3.7
B+		3.3
B	Good	3.0
B-		2.7
C+		2.3
C	Acceptable	2.0
C-		1.7
D+		1.3
D	Poor	1.0
D-		0.7
F	Fail	0.0
I	Incomplete	*
P	Pass	*
S	Satisfactory	*

U	Unsatisfactory	*
W	Withdrew	*
AU	Audit	*
X	Proficiency in Progress	*
Z	No Adequate Evaluation for Grading	0.0

*Not considered in computing GPA.

University policy accepts D- as minimum earned credit. There are certain general education and department major competency requirements that are satisfied only by a higher minimum grade. If a student earns less than this higher minimum grade in such a course, the credits will count toward earned credits but might not count toward completion of general education and department major requirements.

The *semester GPA* is the number of grade points earned in Millersville courses in a semester, divided by the number of credits in that semester for which grades calculated in the GPA were earned. Grade points for *each course* are calculated by multiplying the grade point value by the number of credits for the course.

The *cumulative GPA (CGPA)* is the total number of grade points earned in Millersville courses divided by the number of Millersville GPA credits. Credits from audited courses, subsequently repeated courses, advanced standing programs such as AP and CLEP, and transfer credits are *not* included in the CGPA.

The Millersville grade point average (GPA) is rounded to two decimal places.

GRADES AND POLICIES

Schedule Adjustment: Drop/Add. For fall and spring terms, students may drop or add courses online from the early-registration period until 11:59 p.m. EST, the eighth calendar day of the term, excluding holidays.

During the summer and winter sessions, the registrar will determine equivalent dates for no grade, W grade and regular grade periods. Refer to the registrar's website for details.

Faculty signatures are not required to drop or add a course, unless faculty permission is specifically required. Courses that are dropped during the drop/add period will not be entered on the student's record.

It is the student's responsibility to make official changes to his/her schedule. There is no automatic drop policy for nonattendance.

Withdrew (W). The notation made on a student's record about a withdrawn course depends on when the student withdraws. Students who "drop" or withdraw by the end of the drop/add period have all references to that course deleted from their records. Students will be permitted to withdraw from a course and receive a grade of W up until the end of the 10th week of the semester. The W grade does not carry any quality points and will not be calculated in the student's GPA. There will be no limit on the number of courses from which the student may withdraw. A student who withdraws from their last course is required to submit a form withdrawing them from the University or taking a leave of absence. See *Leaving Millersville University* for more information. After the 10th week of the semester and through the last day of classes, students who withdraw will receive a non-W grade, which will be determined by the instructor, consistent with University policy.

The official date of withdrawal is the date the withdrawal form is submitted with proper signatures to the registrar's office. Deadlines for returning the form are strictly enforced. It is the student's responsibility to obtain all required signatures (both the course instructors and advisors) in time to meet the deadline.

Failure to withdraw from a course properly may result in additional tuition fees as well as a failing grade. Financial aid may also be affected.

See the sections on *Credit Load Policies* and *Tuition* for more information.

During summer and winter sessions, the registrar sets equivalent deadlines for withdrawing from a course without a grade or with a W grade.

To withdraw from a course, contact the registrar's office, Lyle Hall, for an appropriate form, or obtain a form on the web in the Student Forms Center.

Incomplete Policy. An incomplete (I) grade is used to denote coursework that is unfinished due to circumstances beyond a student's control, such as personal illness, accident or death in the family. It is a privilege granted by the instructor because of circumstances, not a right to be expected by the student. A student may request that the course instructor assign an incomplete grade. The instructor may assign an incomplete (I) grade only if the student is passing the course and can complete the remaining requirements without attending additional classes. If class attendance is required to complete course requirements, the instructor must issue a final grade.

An incomplete grade issued to a student on academic probation will not prevent or delay academic action for dismissal. A student's cumulative grade point average will be calculated based on all completed coursework.

A student is encouraged to complete the required work as soon as possible. The deadline for making up an incomplete is at the end of the 10th week of the subsequent regular semester (fall or spring). At the deadline, one of the following actions will occur:

- The instructor submits a final grade on the change-of-grade form.
- The instructor recommends an extension.
- The grade of "I" converts to an F.

A faculty member may petition the school dean for a retroactive administrative withdrawal (W) from a course in which an incomplete grade cannot be resolved due to extraordinary circumstances (e.g., disability or death of the student or faculty). If the petition is

approved, the dean will notify the registrar to record an administrative withdrawal for the course.

Students will not be graduated with unresolved incomplete grades. Degree candidates are notified of the outstanding degree requirements. The degree is not conferred until all requirements have been met.

Pass/Fail Courses (P, F). In order to stimulate and/or satisfy intellectual curiosity, students are encouraged to engage in challenging study on an elective basis. The pass/fail option provides the opportunity for a student to enter a course that he/she might ordinarily avoid. Accordingly:

1. A student may enroll in no more than a total of two courses pass/fail.
2. The student needs to have passed 60 or more credits before electing a course pass/fail.
3. The student must have a minimum GPA of 2.80 or obtain permission of the instructor.
4. The pass/fail option is ordinarily restricted to courses numbered 300 or above. However, a 200-level course may be taken pass/fail with the prior approval of the instructor.
5. Courses taken to satisfy degree requirements for the major, whether offered by the department of the major or offered by other departments as required-related courses, may not be taken pass/fail.
6. Departments may designate which of their course offerings beyond degree requirements their majors may not take pass/fail.
7. Professional education requirements may not be taken pass/fail.
8. Courses taken to satisfy requirements for the minor may not be taken pass/fail.
9. No course used to satisfy general education requirements may be taken pass/fail, but if students take the same courses for other than general education purposes, they may take them pass/fail.
10. Courses taken on a pass/fail basis will be counted toward the total credit-hour requirement for graduation, but those courses that are passed will not be included in the GPA computation on which academic honors and academic standing are based. Courses failed under the pass/fail option will be included when computing the GPA.
11. The minimum grade a student must earn in order to be awarded a "pass" grade is D-.
12. The option to take a course on a pass/fail basis may be exercised until the end of the add period. Contact the registrar's office, Lyle Hall, for the appropriate form. Having properly registered for a course on a pass/fail basis, a student still has the option to take a letter grade instead of a pass/fail grade, provided that the decision to change is filed with the registrar the week prior to finals week.
13. The pass/fail option is limited to students not on probation at the time of registration.

Satisfactory and Unsatisfactory (S, U). These terms describe achievement in student teaching and other field experiences.

Audit (AU). Auditing a course allows a student to attend classes and participate in discussions without the pressures of taking examinations, writing papers or fulfilling other requirements generally associated with earning credit. An audited course is reported on the student's record with the designation AU. It cannot be used to satisfy graduation requirements, nor is it considered in computing GPAs. Standard tuition and fees apply.

To register to audit a course, contact the registrar's office, Lyle Hall, for information and to obtain a permission form, and submit it by the end of the add period. The audit privilege may not be changed to credit status. Audit privileges are ordinarily limited to one course per semester.

Proficiency in Progress (X). This grade reflects progress toward, but not achievement of, proficiency in pre-college developmental courses.

Z Grade (Z). A grade of Z is treated the same as a grade of F in calculating the student's GPA. The Z grade may not be removed or changed except by the student registering for and satisfactorily completing the course. The receipt of a Z grade shall not entitle a student to a refund of fees. This grading procedure is intended to apply only to those students for whom there is no adequate evaluation for the determination of a grade. In those cases in which the faculty member does not assign any grade, the registrar may assign the Z grade if the student has officially registered for the course.

Repeat Policy. A student, in consultation with the advisor, may repeat a course to improve the GPA, to meet minimum competency requirements or to satisfy graduation requirements. Students only need to repeat a failed course if it is specifically required for graduation. Students may repeat courses for which they have received a grade of C+, C, C-, D+, D, D-, F, W, Z or U.

Courses failed at Millersville must be repeated at Millersville in order to earn course credit and credit toward graduation. Students may not transfer credit for any course taken at another institution that is the equivalent of a course previously taken at Millersville; this policy applies whether the course was passed or failed at Millersville University. Students may repeat courses at Millersville for which they have received transferred credit, but they will forfeit the transfer credit.

Once the course is repeated, the new grade, credits and grade point value replace those earned previously in calculating the cumulative GPA. The earlier grade remains on the student's record even though it is no longer included in the computation of credits or cumulative GPA. In consultation with the advisor, students who find it necessary to repeat a course will be informed of, and expected to use, support services available to them through the Office of Learning Services.

An undergraduate student may not take an undergraduate course of record more than three times. A course of record is defined as a course in which a student receives a grade of A, B, C, D (including + and -), F, U, Z or W. The academic department offering a course may drop a student from a course if the student attempts to take a course more than three times. Undergraduate students will be limited to a maximum total of six repeats during their academic career.

GRADE CHANGES

Students are responsible for reviewing grade reports as soon as they are available and contacting their instructor about any grade in question. Grade changes may be made only by the instructor issuing the grade, with the approval of the department chairperson and the school dean. Please refer to the *Other Academic Policies* section of the catalog for details.

COURSE PREREQUISITES

Courses may have a series of prerequisites (satisfactory completion of a prior course, minimum GPA or earned credits, placement test scores, etc.). Students who do not meet the stated prerequisite(s) may be removed from a course at the discretion of the professor. The professor will notify the registrar and student by the end of the drop period. The registration system will also remove a course due to the lack of proper prerequisites; review your schedule frequently to check for changes to your schedule.

TAKING A LESS ADVANCED COURSE

Students do not receive credit for a less advanced course if they have already demonstrated competency by passing a more advanced course. For example, MATH 100 and 101 may not be taken for credit after MATH 161, and FREN 201 may not be taken for credit after FREN 202. Students who wish to review less advanced material may do so on an audit basis.

ACADEMIC STANDARDS, PROBATION, DISMISSAL AND APPEAL

ACADEMIC STANDARDS

The registrar determines the academic standing of all students at the end of each semester and session. Academic standing is based on:

1. The student's cumulative grade point average (CGPA).
2. The total number of Millersville University credits for which the student has enrolled prior to the review credits for audited courses, transfer credits and advanced standing credits are not included.

Students with a CGPA of 2.00 or greater are in satisfactory academic standing. Students with less-than-satisfactory academic standing are subject to academic warning, probation or dismissal as follows:

Review

Credits	CGPA	Action
0.5–16.0	Below 2.00	Warning letter
16.5–32.0	1.75–1.99	Warning letter
16.5–32.0	Below 1.75	Probation
32.5 or more	Below 2.00	Probation
32.5 or more	Below 2.00 while on probation	Dismissal*

*Students on probation at the end of a summer or winter session will be continued on probation for the following semester and cannot be dismissed. A student cannot be dismissed at the end of any fall or spring semester in which he/she has earned a 2.00 or greater semester GPA, even if the CGPA remains less than 2.00.

ACADEMIC PROBATION

Students on probation are limited to registering for no more than 13 credits per semester unless they have the written permission of their academic advisor, their department chairperson, the Director of Academic Advisement or an appropriate designee for each.

A student on probation will return to satisfactory academic standing at the end of the semester or session in which he/she earns a 2.00 or greater CGPA.

ACADEMIC DISMISSAL

A student dismissed for the first time is not permitted to register for or attend classes offered by the University for one semester. A student dismissed for the second time is not permitted to register for or attend classes offered by the University for two semesters. A student dismissed for the third or greater time is not permitted to register for or attend classes offered by the University for three years. A student's dismissal number accrues each time the student is dismissed, regardless of the outcome of any appeal.

Dismissed students are not permitted to register for or attend courses offered by the University during intervening winter or summer sessions. However, students who have registered for winter or summer 1 courses prior to being dismissed may attend said courses. If such winter or summer 1 coursework results in a cumulative GPA of 2.00 or greater, the student returns to satisfactory academic standing.

A dismissed student who wishes to be admitted to the University after his/her dismissal period must apply for admission through the Admissions Office. The Director of Admissions seeks the recommendation of the Academic Standards Committee (ASC) on third or greater dismissal applicants.

ACADEMIC DISMISSAL APPEAL

Students who have been dismissed will receive a Notice of Dismissal from the University. That notice will describe the procedures for appealing the dismissal sanctions. It is the student's responsibility to keep abreast of his/her academic standing and to be proactive in any appeal process.

Students who have been dismissed and believe extenuating circumstances affected their academic performance may submit a

formal letter of appeal and supporting documentation to the ASC in care of the registrar's office. In order to be considered, letters of appeal must be received within eight business days of the date that appears on the Notice of Dismissal.

Students who are dismissed for the first time have the option to appeal in person before a subcommittee of the ASC, in addition to submitting the required written appeal. Students who are dismissed for the second or greater time may only appeal in writing.

The academic decision of the ASC subcommittee is on behalf of the entire ASC, and is therefore final and not subject to further review. The chairperson of the ASC or his/her designee will provide the appellant with a letter stating the decision of the ASC and terms (if any) for future action. Examples of such terms include a reduced credit load, the repeat of coursework and the recommendation to seek assistance from student-support services. Under no circumstances will the chairperson or subcommittee of the ASC modify the duration of a dismissal period prescribed herein.

After the ASC's decision, if an appellant believes the appeal process was not administered as prescribed herein, the appellant may pursue an appeal of the process, but not the academic decision, in writing, to the Associate Provost for Academic Administration. Such an appeal must be made within 10 business days from the date of the decision letter from the chairperson of the ASC. The appellant is advised to provide as much written documentation as possible, describing why the process was not administered as prescribed herein, and any supporting materials. The decision of the Associate Provost for Academic Administration regarding the process appeal is final and not subject to further review.

SEMESTER CREDIT-LOAD POLICIES

FULL-TIME/PART-TIME STATUS

To be considered full-time, undergraduates must be registered for at least 12 credits by the end of the drop/add period. Audited courses are included in the computation of semester credit load.

RECOMMENDED CREDIT LOADS

The normal semester load for undergraduates is 15 credits during the freshman year and 15 or more credits in subsequent years. Students with GPAs below 2.00 are strongly advised to take fewer than 15 credits; students on academic probation are limited to 13 credits per semester.

Students who have completed fewer than 80 credits may not register for more than 17 credits. Additional courses may be added at the beginning of the semester during the drop/add period.

More than 18 credits will require additional payment at the current charge per credit hour.

Students may not register for more than 21 credits in one semester.

During the semester in which a student is enrolled in student teaching, one additional course may be taken, provided the course does not conflict with the student-teaching assignment.

Students should recognize that some programs require more than 120 credits. Completing these programs or a second major or minor may require carrying semester loads above 15 credits, attending summer school and/or taking more than four years to complete a degree.

SUMMER AND WINTER SESSIONS

The recommended course load during any summer session (I, II, III) or winter session is two courses. Students should consult their academic advisor before registering for more than two courses in any session.

OVERLOADS

Normally, students may not carry more than 21 credits in any one semester. Students enrolled in student-teaching courses may enroll for one additional course if it does not conflict with the student-teaching assignment.

LEAVING MILLERSVILLE UNIVERSITY

Students who wish to leave Millersville before graduating may take a temporary leave of absence or withdraw completely.

LEAVE OF ABSENCE

Students who wish to interrupt their studies at Millersville for up to two consecutive semesters may request a leave of absence. This allows them to register for courses upon their return without applying for readmission. To be eligible for a leave of absence, a student must be enrolled in degree status and have a minimum CGPA of 2.00.

To request a leave of absence, complete an official Leave of Absence form, available from the registrar's office (Lyle Hall) or on the Millersville website in the Student Forms Center. Contact the registrar's office for information on the effects of a leave of absence.

Students who take a leave of absence to study at another institution during the fall or spring semester should also complete an Authorization for Transfer of Credit form, available from the registrar's office or on the web in the Student Form Center.

A leave of absence is cancelled, and the student considered withdrawn, if the student fails to return by the established ending time or is dismissed by the University.

MILITARY LEAVE OF ABSENCE

Students who are called to active duty must contact the registrar's office for assistance with arranging a leave of absence and their subsequent return to the University. A copy of the student's military orders must be presented to the registrar. Students who expect to return to class within the current semester to complete their coursework, or who are called to duty after completing a significant

part of the course requirements, should contact their faculty regarding missed work. Students who cannot complete the current semester will be granted a leave of absence for military duty and will be allowed to return for the next semester without penalty.

WITHDRAWING FROM THE UNIVERSITY

Students who wish to withdraw from the University must complete an Official Withdrawal Form, available from the registrar's office or on the Millersville website in the Student Forms Center. This applies to all students, whether withdrawing during or between semesters, regardless of reason for withdrawal. Failure to complete this form will jeopardize a student's chances of future readmission.

Students who have officially withdrawn from the University and wish to return should contact the admissions office, Lyle Hall, for an application for readmission. See the *Admissions* section for more information.

OTHER ACADEMIC POLICIES

REVIEW OF PROGRAMMATIC STANDARDS

The University's programmatic and assessment standards are established by the respective college and monitored by the college dean. A student may discuss issues related to these standards with the school dean. The college dean(s) and the University's provost, however, maintain ultimate authority to determine whether a student has successfully satisfied the programmatic and assessment standards, including preliminary, qualifying and comprehensive examinations.

Faculty members are charged with the responsibility of evaluating a student's academic performance in accordance with the faculty member's professional and academic judgment. The deans of the University's colleges establish the programmatic standards for their respective colleges and will review any issues related to those standards. The following procedures must be followed by students challenging these academic determinations or those encountering a problem with an academic affairs process. Appeals dealing with Academic Dismissal from the University, violations of the Academic Honesty Policy or violations of the Student Code of Conduct are handled by separate processes.

ACADEMIC APPEALS

Academic Determination

When a student disagrees with an academic determination by a faculty member, the student and the faculty member must meet, within 30 days of the release of the academic determination, to discuss the disputed issue and attempt, in good faith, to resolve the matter. The student has the responsibility to contact the faculty member so that the meeting can be arranged. If the student and faculty member are unable to meet within the specified time period, the student must contact the faculty member's department chair within 10 calendar days of the above time period to move to the next phase of the appeal.

If the student and the faculty member are unable to mutually resolve the dispute, the student must file a written appeal with the faculty member's department chair within 10 calendar days of the student/faculty member discussion. The student is advised to set forth in detail the basis for the appeal and provide written documentation in support of the appeal. The department chair will request a written statement from the faculty member and may meet with the faculty member as well. The department chair will review the appeal and any supporting documentation and then meet with the student. The department chair will notify the student and the faculty member of his or her decision within 10 calendar days of receipt of the appeal.

If the department chair's decision does not resolve the dispute, the student may submit a written appeal with the appropriate college dean within 10 calendar days from the date of the department chair's decision. The student should include any written documentation in support of the appeal. The college dean will request a written statement from the faculty member and may meet with the faculty member as well. The college dean will review the appeal and any supporting documentation and will meet with the student. The college dean will notify the student, the department chair and the faculty member of his or her decision within 10 calendar days of receipt of the appeal. The decision of the college dean is final and not subject to further review.

Academic Affairs Process

When a student encounters a problem with an academic process at the University (e.g., transfer of credit from another institution, missing or incomplete information in a student record, etc.), the student should attempt to resolve the problem by contacting the staff member, or appropriate administrative office, within the divisions of Academic Affairs or Student Affairs and Enrollment Management within 30 days of identifying the error. The student and the staff member must discuss the disputed issue and attempt, in good faith, to resolve the matter.

If the student and the staff member are unable to mutually resolve the dispute, the student must file a written appeal with the staff member's supervisor within 10 calendar days of the student/staff member discussion. The student is advised to set forth in detail the basis for the appeal and provide written documentation in support of the appeal. The supervisor will request a written statement from the staff member and may meet with the staff member as well. The supervisor will review the appeal and any supporting documentation and then meet with the student. The supervisor will notify the student and the staff member of his or her decision within 10 calendar days of receipt of the appeal.

If the supervisor's decision does not resolve the dispute, the student may submit a written appeal to the Associate Provost for Academic Administration within 10 calendar days from the date of the supervisor's decision. The student should include any written documentation in support of the appeal. The Associate Provost will request a written statement from the staff member and may meet with the staff member as well. The Associate Provost will review the appeal and any supporting documentation and will meet with the student. The Associate Provost will notify the student, the supervisor and the staff member of his or her decision within 10 calendar days of receipt of the appeal. The decision of the Associate Provost is final and not subject to further review.

CLASS STANDING

Class standing is based on total credits earned, including those transferred from other colleges and earned through advanced standing programs, such as CLEP, as follows:

Credits Earned	Class Standing
0–29.5	Freshman
30–59.5	Sophomore
60–89.5	Junior
90 or more	Senior

CLASS ATTENDANCE POLICY

The University supports departmental and faculty class attendance policies that are reflective of and consistent with University-approved guidelines. Faculty will include their class attendance policy in their syllabi given to all students in their classes at the start of the semester.

University-Approved Guidelines:

- Students are expected to attend all classes. It is the student's responsibility to complete all course requirements even if a class is missed. If a student misses class for an officially excused reason, then he/she is entitled to make up the missed work, but only at the convenience of the faculty member. Responsibility for materials presented in, assignments made for, and tests/quizzes given in regularly scheduled classes lies solely with the student.
- The University policy is that faculty will excuse absences for the following reasons:
 - personal illness
 - death or critical illness in the family
 - participation in a University-sponsored activity
 - jury duty
 - military duties
 - religious holidays
- Faculty judge the validity of student absences from class within the University's approved guidelines and may require documentation for excused absences. Faculty will evaluate any reason, other than those listed above, for a student missing class and determine whether the absence is justified. In these circumstances, a student may make up missed work at the discretion of the instructor.
- In the case of foreseeable absences, students are encouraged to notify the faculty member in advance. A student who will miss class due to participation in an official University activity must notify the instructor well in advance of the activity to assure that the absence is excused.

COURSE NUMBER SYSTEM

Millersville University uses the following course-numbering system:

000-099	Pre-college developmental courses.
100-199	Courses primarily designed for freshmen.
200-299	Courses primarily designed for sophomores.
300-399	Courses primarily designed for juniors and seniors.
400-499	Courses primarily designed for seniors.
500-599	First-level graduate courses (these courses may be taken by advanced undergraduates but may not be required of an undergraduate student).
600-	Graduate-level courses.

The following course numbers are reserved:

300, 400, 500	Cooperative Education experiences.
179, 279, 379,	
479, 579, 679	Experimental courses.
489	Honors courses.
498	Independent study.
499	Departmental honors/thesis/University Honors College thesis.

DEAN'S LIST

A student is eligible for the dean's list after a given semester if he or she has:

- Earned a semester GPA of 3.50 or higher, and;
- Attempted at least 12 credits of undergraduate coursework, excluding those courses not used to compute the GPA.

GRADUATION HONORS FOR A BACCALAUREATE DEGREE

Students who have earned consistently superior grades in their coursework at Millersville University are recognized for their achievements at graduation with the designation of graduation honors. The student's diploma and University record carry the appropriate honors designation:

Cum laude for a cumulative GPA between 3.50 and 3.74

Magna cum laude for a cumulative GPA between 3.75 and 3.94

Summa cum laude for a cumulative GPA between 3.95 and 4.00

Eligibility for graduation with honors is determined based on the Millersville grade point average. Neither transfer work nor in-progress courses are included in the honors GPA. For students who have been awarded academic amnesty, the pre-amnesty work is not included in calculating the honors GPA.

Changes in the eligibility for, or the level of, honors following the posting of grades for the final semester at Millersville will be reflected on the student's diploma and Millersville transcript.

To qualify for graduation honors, students must:

1. Earn a GPA of 3.50 or higher in work done at Millersville, and;
2. Complete at least 60 credits of Millersville coursework.

Graduation Honors for Associate Degree Candidates. To qualify for the designation "with honors" on their diploma and University record, associate degree candidates must:

1. Earn a GPA of 3.50 or higher in work done at Millersville, and;
2. Complete at least 30 credits with grades A through D- of Millersville coursework.



CAMPUS LIFE

Millersville University

MILLERSVILLE UNIVERSITY 2016 - 2017

CAMPUS LIFE

SERVICES FOR STUDENTS

Millersville University offers a number of programs and services designed to identify students' academic and personal needs, to develop their skills and abilities to meet their needs, and to support their academic efforts.

DEPARTMENT OF ACADEMIC AND STUDENT DEVELOPMENT

Millersville University considers academic advisement to be an integral part of the undergraduate experience, from orientation to graduation. The academic advisement process is devoted to helping all students achieve their academic goals. This process involves the total campus community, including students, faculty, staff and the administration. Advisors work with students in the clarification of educational goals, the planning of a program of study, the selection of courses and the utilization of programs and services at Millersville University.

Every student has an assigned advisor. Students in majors have a faculty member from their department as an academic advisor. Students in the nationally recognized Exploratory Program have a specially trained advisor who may be a faculty member, staff member or administrator at Millersville.

Advisors at Millersville have the responsibilities of assisting students with course selections and program requirements; being knowledgeable about University policies and procedures; helping students to understand and complete the general education curriculum; being accessible to their advisees via office hours, phone and email; referring students to appropriate resources on campus and helping students who need assistance to improve their academic standing. Students share responsibility with their advisor for completing degree requirements and meeting with their advisor on a regular basis to discuss their academic and career plans and questions.

Academic and Student Development is located on the second floor of Lyle Hall. The office has a comprehensive website at www.millersville.edu/advisement. The Exploratory Program also has a website which includes relevant information for the undecided/undeclared student at www.millersville.edu/explore. The office has an email for advisement-related questions at adviser@millersville.edu.

CAREER SERVICES

Experiential Learning and Career Management, located in Bedford House, offers career programs and services to help students/alumni clarify and attain educational and career goals. Choice of academic major, exploration and selection of an appropriate occupation, awareness of employment trends and skill development for finding and landing prime jobs need to be an integral part of a college education. The staff assists students/alumni with these important activities. Career counseling, computer-assisted career guidance and current information on hundreds of occupations are available to students.

Interactive programs help students:

- Identify their interests, values and personality traits as they relate to careers.
- Analyze employment trends and their influence on career choice.
- Learn how to research and evaluate career information.
- Discover how to make a realistic and satisfying choice of major.

All students who are not certain about their present major or have not selected a major are encouraged to participate in these programs. Instructional resources online and individual counseling appointments are available for resumé writing, interviewing and job-search strategies. Also available online are job vacancies, resumé referrals, links to job fairs and electronic resources to research potential employers.

Millersville University hosts a job and internship fair each semester as well as participates in regional job/intern fairs. A graduate school fair is also held each fall.

During fall and spring semesters, the office hours are 8 a.m.-5 p.m., Monday through Friday. A counselor is available to answer general questions and critique resúms in Bedford House during established walk-in hours, which are posted on the web. For more information, go to www.millersville.edu/elcm/careerservices.

CENTER FOR COUNSELING & HUMAN DEVELOPMENT

The Center for Counseling & Human Development is located on the third floor of Lyle Hall. The center offers students the opportunity to discuss any matter freely and in a confidential, professional setting. There is no cost to students for this service. Licensed psychologists help students reach greater self-understanding and enhance their abilities to manage immediate and future concerns. Individual counseling, crisis intervention, workshops, group experiences, psychiatric services by a board-certified psychiatrist and consultations are available to counseling center clients. Alcohol counseling and other drug counseling are available, which is provided by a Certified Addiction Counselor. *Counseling services are strictly confidential.*

HEALTH SERVICES

Millersville University Health Services (MUHS) strives to provide students with easy access to services necessary for maintaining health and well-being. Located in the Witmer Building, MUHS is staffed by board-certified physicians, nurse practitioners and registered nurses Monday-Friday. Services offered by MUHS include (but are not limited to) office visits by appointment, evaluation and treatment of acute illness/injury, physical examinations, vaccines/TB screening, allergy shot administration, lab services, reduced-price medications, women's and men's services, referrals to specialists and health information/education.

In order to best serve students, MUHS requires that all new students submit a Health Evaluation Form, which includes a TB screening, immunization record and a physical examination prior to matriculation to the University. The Health Evaluation Form can be

accessed online at www.millersville.edu/healthservices/files/healthevaluationform.pdf. The deadline for submitting the Health Evaluation Form is August 1 for fall matriculation and January 1 for spring matriculation. For more information, call 717-871-5250, visit www.millersville.edu/healthservices or e-mail hservices@millersville.edu.

MILLERSVILLE MENTORING ALLIANCE PROGRAM

The Millersville Mentoring Alliance Program (MMAP) provides interested Millersville University students with effective, one-on-one mentoring by connecting them with qualified, competent Millersville faculty, staff, peers, alumni and community mentors. These volunteer mentors are committed to encouraging students to develop their full potential in all areas of their lives. Through sustained, supportive and nurturing mentoring relationships, the MMAP strives to enhance the learning and holistic development of Millersville University students. For more information, email mmap@millersville.edu, call (717) 871-5361 or visit www.millersville.edu/mmmap.

ORIENTATION

Orientation begins the transition to the University's environment and expectations; it is the first step in the collegiate experience. Before beginning classes, Millersville's orientation program offers an opportunity for new and transfer students to become familiar with campus facilities, services and people.

The orientation program is offered to all students and tailored to student needs. The scope and format depends on the semester in which the student plans to enroll and usually includes meeting with academic departments, information on campus life, and opportunities to meet other incoming students to help students transition both academically and socially to the University community.

PRE-PROFESSIONAL ADVISEMENT

Pre-professional advisement is available to students contemplating professional post-baccalaureate programs such as law or medicine. It is a secondary system that helps students prepare for admission to—and success in—these programs.

Health Professions Advisory Committee (HPAC). This multidisciplinary faculty panel advises students interested in attending schools of allopathic medicine (M.D.), osteopathic medicine (D.O.), podiatry, optometry, dentistry or veterinary medicine. Students in any major may meet with, seek advice from and be interviewed by this committee. Contact the Department of Biology, Caputo Hall, for details.

Pre-Law Advisement. Students interested in preparing for law school are assigned a special pre-law advisor in the department of their major, if possible. These advisors help students identify areas of study that law school admissions offices consider important. They also help students prepare for the law school admissions test (LSAT), identify appropriate law schools and complete the application process. Contact the Department of Government & Political Affairs for more information.

SERVICES FOR COMMUTERS

Commuting students are an integral part of the University community. Philadelphia House is a special facility for commuters, with rooms for studying and relaxing and a kitchen for preparing meals. The Commuting Students Association (CSA) holds meetings and activities in both the Student Memorial Center and the Philadelphia House.

Parking permits are available to commuting students for a nominal fee. Public buses run regularly between the city of Lancaster and the Millersville campus. Bus schedules are available in the Student Memorial Center.

SERVICES FOR NONTRADITIONAL AND ADULT STUDENTS

While the majority of Millersville undergraduates are full-time residential students of traditional college age, an increasing number of students are working professionals, commuters, age 23 or older, attending part-time and/or parents of young children. Millersville is working to meet the needs of these students through a variety of services.

For information on admission to Millersville as a nontraditional or adult student, see the section on *Admission to Millersville University*. For more information on services for adult students, contact the CGSAL at profdev@millersville.edu or call (717) 871-7171.

SERVICES FOR STUDENTS WITH DISABILITIES

The Office of Learning Services provides academic and housing accommodations as well as auxiliary aids to students with disabilities. Services are provided at no cost to the student. Students with disabilities are encouraged to submit eligibility documentation as soon as they receive admission to the University to allow time to arrange services. For more information on services for students, call 717-871-5554.

SHUTTLE BUS SERVICE

Millersville University has a shuttle bus that runs throughout the campus and to surrounding apartment complexes and shopping centers in the Lancaster area. Schedules are available in the Student Memorial Center, at the Student Information Desk located just inside the main entrance. The schedule plus additional information can be found at www.millersville.edu/shuttlebus.

TITLE IX COORDINATION

The Title IX Coordinator is responsible for the development, implementation and monitoring of appropriate policies, procedures and practices designed to comply with federal and state legislation, regulation and case law requiring the prompt and equitable resolution of all complaints pursuant to Title IX.

Equal Employment Opportunity, Affirmative Action, and Titles VI, VII, VIII and IX (handling discrimination and sexual misconduct complaints, including intake, investigations, tracking and resolution) are managed through a collaborative process between the Office of Human Resources and the Title IX Coordinator and a team of deputy Title IX coordinators and victim-support staff. The University's Title IX Coordinator is Mr. Robert G. Wood, 717-871-4100, MUTitleIXCoordinator@millersville.edu.

TUTORIAL SERVICES

Tutoring is available through the Millersville University Tutoring Center, a division of the Office of Learning Services, 717-871-7222, in the following areas: select departments in the CEHS, departments in the CAHSS and departments in the CST (math tutoring available only for students with disabilities; all other students should seek math tutoring directly through the Math Assistance Center).

UNIVERSITY DINING SERVICES

Millersville operates a comprehensive dining service program for students, faculty, staff and guests of the University. All students are eligible to participate in the dining program. Students who reside in the University residence halls, including Shenks Hall and Reighard Hall, are required to purchase a meal plan. Off-campus students and commuters may participate in any of the University's meal plans, which offer exceptional flexibility at various locations throughout the campus.

The University's main dining hall is located at the Upper Deck in Gordinier Hall. Students and guests may dine at this location as well as the Galley food court in the Student Memorial Center and The Anchor in Gordinier Hall. The Anchor, located on the first floor of Gordinier Hall, features Sun Roast Coffee, a bakery showcasing items from our own bake shop, Grab 'n Go and made-to-order selections, a convenience store, a creamery and a full range of beverages. Other dining options include the Cyber Café in Caputo Hall for sandwiches and snacks, and Starbucks, which is located in the Francine G. McNairy Library and Learning Forum. Smoothies and protein shakes are available for a pre- or post-workout, along with healthy and low-fat snacks at the Juice Bar, located in the Student Memorial Center. Our newest service is provided by The Marauder Express, our own University Food Truck, which serves the campus community throughout the day and late night. Descriptions of meal plans and dining hours are available at www.millersville.edu/dining.

For more information, see the section on *Expenses*.

UNIVERSITY TEST CENTER

The University Test Center administers a variety of standardized tests to candidates seeking teacher certification, graduate or professional program admission, and course credit by examination.

For a full description of services and test schedules, contact the University Test Center, Stayer Hall, 717-871-4168, or www.millersville.edu/testcenter for the latest information.

WRITING CENTER

The Chryst Writing Center and Annex help students with all aspects of their writing, from idea development and organization to proofreading strategies. Students who want to improve their writing skills, techniques and styles can make appointments to consult on an assignment or to discuss general concerns. All levels of writing help are available, and students from all disciplines and classes are welcome.

The Chryst Writing Center is located on the first floor in Chryst Hall; it holds its evening hours in its annex on the first floor of the Library. For more information and hours, see www.millersville.edu/english/writingcenter.

CENTER FOR HEALTH EDUCATION AND PROMOTION

The Elsie S. Shenk Center for Health Education and Promotion, located in the Montour House, contributes to fulfilling the educational mission of Millersville University through empowering students to make informed decisions and develop lifelong skills that enhance their personal well-being. The Center contributes to increasing the academic success, productivity and retention of students by providing current and relevant information about high-risk behaviors; raising awareness about personal decision making and the impact decisions have on an individual and their community; and engaging students in meaningful opportunities to create a healthy community in which all students can achieve their personal and academic goals.

The Center for Health Education and Promotion features trained peer educators who provide lifestyle education programs, awareness events and outreach on topics including alcohol and other drugs, mental health, sexual responsibility/healthy relationships and sexual violence. In addition to peer education programs, the Center offers an annual Wellness Fair, education campaigns to promote the healthy decisions made by Millersville students, and various publications, including "Stall Talk"—the campus restroom newsletter!

COMMUNITY SERVICE

Volunteer Central, an Experiential Learning and Career Management Program located in Huntingdon House, engages students in worthwhile service activities both on and off campus. Programs include Project Cygnet, a tutoring and mentoring program for at-risk schoolchildren; Into the Streets, a full day of service each spring; events to increase awareness and fundraising for local organizations for the homeless and hungry; and First Book, which provides books to low-income children.

Volunteer Central works with many nonprofit organizations in Lancaster and York counties to offer rewarding and often challenging service experiences. Students may volunteer with a transitional living center, health clinic, animal shelter, daycare center, museum, library or other organizations to explore career options, gain work experience and serve the community.

Volunteer Central works closely with the Office of Financial Aid to coordinate the Federal Work-Study program. Eligible students may choose to work at a nonprofit organization, serving the community while earning their federal award. Popular federal work-study placements include tutoring in city schools and after-school programs, food banks and senior centers. Many organizations are located on public bus routes.

For more information, go to www.millersville.edu/elcm.

STUDENT HOUSING

ON-CAMPUS HOUSING

Millersville has suite-style residence halls offering a variety of housing lifestyles: coeducational honors, service learning, international, and special-interest theme areas. Each residence hall is staffed by professional staff and specially selected and trained undergraduate resident assistants. The staff strives to maintain an environment conducive to study and social interaction. Special residence hall programs, including lectures, intramurals, and athletic and recreational programs, are offered throughout the year.

Millersville University firmly believes that residence hall living is beneficial for the academic adjustment, campus engagement and personal development of its students. Therefore, all full-time undergraduate students (those enrolled in 12 or more credit hours as of the end of the period held each fall and spring semester during which students may drop and add courses) are required to live in University residence halls until they have earned 60 credit hours or have completed four regular (fall or spring) semesters, whichever comes first.

In addition, the University may make exceptions to the residence hall requirement for full-time students who are:

- Commuting from the home where they live with their parent(s) or legal guardian, provided the one-way commuting distance does not exceed 40 miles. The University requires a notarized written verification of a student's commuting status from the parent(s) or legal guardian. *NOTE: A Request to Change to Commuter Status* is available on your MAX Account — Student Services — Housing Dining — Off-Campus Request.
- Married.
- Custodial parents.
- Twenty-one years of age or older by the beginning of the term for which an exception to the residence hall requirement is requested.

Housing is available and encouraged for students entering their third year at Millersville University. Questions regarding this policy and requests for exceptions to it should be directed to Housing & Residential Programs. Details of residence hall policies and procedures are in the *Living On Campus* section on our website at www.millersville.edu/housing.

OFF-CAMPUS LIFE

Millersville University maintains a listing of local landlords and property owners from the surrounding community who historically rent rooms, houses or apartments to our students. All off-campus residences fall within the category of "independent" student housing. This designation means that the University does not endorse residences off campus. The University Housing & Residential Programs office serves as a reference agency, collecting information on off-campus housing opportunities and preparing a periodic listing for the convenience of the campus community. The Housing & Residential Programs office also provides educational workshops for eligible students interested in moving off campus.

Students not admitted as commuters must live on campus until junior status (60 credits) is achieved.

STUDENT INVOLVEMENT

Millersville University believes that the lifelong benefits of a college education are not derived solely from the classroom. Therefore, one of the University's priorities is to develop the full potential of its students and in so doing enhance the quality of their lives. To achieve this goal, Millersville offers a wide variety of extracurricular activities to supplement academic experiences and develop confidence, self-sufficiency, and social and leadership skills. Student activities enrich student lives and play a critical role in developing personality and character.

Virtually any student interest or need may be met through one of the over 150 organizations on campus. Students whose particular interests are not represented by an existing organization may establish a new club by following procedures set forth by the Student Senate.

Many student activities are funded by student activity fees. Allocations to organizations and programs are decided by the allocations committee of the Student Senate, with approval of the full senate and the University president. Student organizations are open to all enrolled Millersville students and are divided into several general-interest categories: academic and professional, arts and culture, Greek life, multicultural, service and civic engagement, sports and leisure, and spirituality.

For a complete listing of all student organizations, see the Get Involved website at getinvolved.millersville.edu.

ATHLETICS AND RECREATION

Intercollegiate Athletics. Intercollegiate athletics have a long and proud tradition at Millersville University. They are designed to meet the needs of both participants and spectators. All intercollegiate teams compete at the Division II level and are members of the Pennsylvania State Athletic Conference (PSAC). Two full-time certified athletic trainers and student trainers serve all intercollegiate teams.

Men's programs are available in baseball, basketball, football, golf, soccer, tennis and wrestling. Women's programs are available in basketball, cross-country, field hockey, lacrosse, soccer, softball, swimming, tennis, track and field, golf and volleyball.

Intramural Athletics. All students are encouraged to participate in intramural sports, which are planned and administered with considerable student input. Activities include badminton, basketball, flag football, inner tube water polo, racquetball, soccer, softball, ultimate frisbee, volleyball, dodgeball, floor hockey, badminton and tennis.

Club Sports. Club sports offer organized, nonvarsity competition and recreational activities. Club sports currently active on campus include dance, bowling, ultimate frisbee, fencing, ice hockey, martial arts, men's soccer, men's lacrosse, men's volleyball, roller hockey, rugby, water polo and running.

Recreational Activities. Millersville's gymnasium and swimming pools are open for recreation at scheduled hours. For more information, contact the director of campus recreation in the Student Memorial Center.

Athletic and Recreational Facilities. Millersville's facilities include three gymnasiums; two swimming pools; two raquetball courts; several weight-training facilities; outdoor tennis and basketball courts; lighted, multipurpose synthetic-turf stadium and practice field; fields for field hockey, baseball, soccer, softball and a low and high ropes course.

STUDENT MEMORIAL CENTER (SMC)

Much of the social life on campus centers within the Student Memorial Center (SMC). The building's facilities offer many opportunities for recreation and socializing.

The SMC has six furnished conference rooms and a multipurpose room that can handle various setups/weekly meetings, guest speakers and special events. Reservations for conference rooms and the multipurpose room can be made online via ASTRA scheduling. This is required for registered student organizations, or at the Information Desk for faculty and staff.

The Business Office is located on the main level of the SMC. This area houses the banking services for registered student organizations. Personal checks up to \$50 may be cashed with a valid Millersville University ID Card. This office also exchanges cash for change needed for laundry machines. The Ticket Sales office is located near the Business Office. Tickets for campus events can be purchased here. In addition to these services, the Pennsylvania State Employees Credit Union has an office in the SMC.

The Galley, a spacious dining area, is located in the SMC and provides students, faculty, staff and visitors with an extensive menu. A juice bar is also located on the main floor near the Reighard Multipurpose Room.

The University Store is located in the northern end of the SMC. A large selection of imprinted campus apparel, art supplies and materials required for class are located on the upper level. The store also offers store gift cards, postage stamps, computer accessories, a variety of greeting cards and a wide selection of gift items. The lower level features the Textbook Department along with a full service Copy Shop, which includes copies, fax services, lamination, binding and poster printing.

The Fitness Center offers a top-of-the-line facility designed to meet the fitness needs of students, faculty, staff and alumni. This facility also provides a diverse selection of workout equipment, which includes cardiovascular machines, weight-training machines and free weights along with an indoor track, three basketball courts, a multiuse court and two raquetball courts.

EDUCATIONAL AND POPULAR PROGRAMMING

A wide range of cultural and popular programming is provided for the students by the Millersville University Activities Board (UAB). Funded by the Student Senate, it is a student-run organization divided into committees, with each committee responsible for programming in their specific area (i.e., films, noontime programs, multicultural activities, concerts, coffee house entertainment, public relations and travel). The performing arts series is scheduled by the Cultural Affairs Committee and is described under *Special Academic Opportunities*.

STUDENT SENATE

To foster an atmosphere of open communication within the University, Millersville offers a number of avenues for student participation in University governance. Consultation with students is an integral step in any major decision. The aim of the Student Senate is to encourage students to participate in sound governmental procedures and develop innovative and creative University programs.

Students participate in University governance through Student Senate and Faculty Senate committees such as the Undergraduate Course and Program Review Committee, the Academic Policies Committee, the Cultural Affairs Committee, the Faculty-Student Athletic Committee and by serving on the board of directors of Student Services, Inc., Faculty Senate as Student Senate President, and one student is appointed as a member of the Council of Trustees.

As the governmental body of the students, the Student Senate is an integral component in the governance of the University and works with the faculty and administration on major University policies. The Senate approves the constitution of every campus organization, delegates responsibility to its constituent groups, recommends the allocation of activity fee funds and makes emergency allocations to recognized University organizations when necessary. These decisions are subject to approval by the University president.

STUDENT COMMUNICATIONS MEDIA

The Snapper, *George Street Carnival*, MUTV 99 and WIXQ-FM are the official student communications media of Millersville University.

The Snapper is the University's student-run newspaper, published weekly during the academic year. For many years the paper has won the highest awards given by major press associations.

MUTV 99, the student-operated campus cable TV station, provides the University with 24/7 programming throughout the school year.

WIXQ-FM, the campus radio station, provides the University and local community with educational programming, news, sports, talk shows and music. The station adheres to all Federal Communications Commission regulations and is student operated.

RELIGIOUS AND SPIRITUAL DEVELOPMENT

Millersville University supports students through their academic, social and interpersonal development, including their spiritual journey. Several organizations offer religious and spiritually inspirational social and cultural programming, including United Campus Ministry, Navigators Bible Campus Ministry, Hillel, InterVarsity Christian Fellowship, John Newman Association (Roman Catholic), University Christian Fellowship, Reformed University Fellowship and Athletes Bible Fellowship.

Millersville-area churches welcome students to their services, and several sponsor programming specifically for students. Students who do not find a place of worship in Millersville will find many options available in the nearby city of Lancaster. Three synagogues in Lancaster represent the Reform, Conservative and Orthodox branches of Judaism. Seven Muslim mosques are located in the Harrisburg area; a Buddhist association is in Columbia; and a Hindu temple is in New Cumberland. For more information, visit the Faith & Spirituality link on the Student Affairs page at www.millersville.edu/studentaffairs.

FOREIGN LANGUAGE MEDIA CENTER

The foreign language media center in McComsey Hall includes the instructional digital language lab with 30 student stations, as well as a smaller learning lab with a variety of visual, audio, computer and print materials for the study and teaching of French, German and Spanish. The media center is also connected to several satellite receivers, and both live and delayed newscasts are available in foreign languages.

FRANCINE G. MCNAIRY LIBRARY AND LEARNING FORUM

The Francine G. McNairy Library and Learning Forum is home to the library, the Instructional Technologies and Support Team, the Center for Academic Excellence (CAE), Coordinator of General Education and the Office of Sponsored Programs and Research Administration. The building also houses a Starbucks Café, the Digital Learning Studio and the Writing Center Annex.

In 2012, the McNairy Library completed a total life-cycle renovation and expansion, bringing state-of-the-art facilities for research and learning to campus. Students, faculty, staff and administrators can use flexible, technology-rich spaces for group and individual study in addition to receiving assistance from librarians and information professionals.

Members of the University community can access library resources by visiting the building, or online at www.library.millersville.edu. In addition to an extensive virtual collection of electronic books and journal databases, the library has hundreds of thousands of books and DVDs. Specialized collections include K-12 materials for students in the teacher education program and University Archives and Special Collections, a repository for unique historical documents and records focused on the University and region.

APPLIED ENGINEERING, SAFETY & TECHNOLOGY

Osburn Hall is devoted exclusively to the Department of Applied Engineering, Safety & Technology, providing classrooms, laboratories, offices and other spaces that support applied engineering and technology education, and occupational safety and environmental health programs.

Osburn Hall is a dedicated 70,000-square-foot facility designed with instructional and research capabilities around the technology clusters of communications, energy/power/transportation, occupational safety and environmental health, and production (manufacturing and construction). Research and development facilities, classrooms and faculty offices have been located adjacent to each cluster. Communication and data capabilities enable flexibility and future applications.

The lower level of Osburn Hall includes an electronics lab, an energy/power/transportation lab and an automation and robotics lab. It also has a student lounge, central storage and a maintenance/repair area. The main floor includes production labs to study manufacturing and construction, an innovation laboratory and an Integrative Stem Laboratory for technology education, an administration office complex and a 60-seat multipurpose room. The upper level is dedicated to communication technology and to occupational safety and environmental health, with laboratories for computer-aided drafting and design with rapid prototyping, graphic communications, desktop publishing and media development in the north portion, and fire protection/hazardous materials, safety engineering, ergonomics and industrial hygiene in the southern portion.

The specialized technical equipment and software that is used includes computer-aided drafting and design with AutoCAD and other software, rapid prototyping, nanofabrication microscopes, computer-controlled machining (CNC), materials testing, an automated manufacturing center, robots, programmable logic controllers, digital electronics, desktop publishing, conventional and specialty printing and packaging, multimedia development and instruction, multicolor printing, laser technology, fluid power, noise dosimeters and safety engineering training modules. Osburn Hall has direct wireless access to the global community and its electronic information resources. Two high-end PC and Macintosh computer laboratories are available for use by all University students.

INFORMATION TECHNOLOGY

Information Technology provides a wide variety of services for faculty, staff and students that enhance the processes of research, instruction and learning. These services include training materials relating to software products, maintenance and support for classroom technology, documentation and how-to instructional materials, assistance in statistical analysis of data and advice on purchasing decisions.

Over a dozen general-purpose and specialized computer laboratories located throughout the campus, and housing more than 475 computers, provide students with convenient access to the University network, email and the Internet. These labs are multimedia-capable and may be used by faculty as technology classrooms to enhance the students' learning experiences. The labs are available during daytime and evening hours.

Millersville University has a robust, high-speed, campus-wide network that connects all major buildings and residence halls to campus network services and the Internet. Every Millersville student automatically gets a myVille account and an email account upon admission to the University. myVille is the student portal to the University's computing and networking systems—the student access point to Millersville University's online services. Residence hall students must have valid myVille accounts to access the Internet from their resident hall rooms. This is also true for all students using computers in the various computer labs around campus. Network and Internet usage are governed by the Millersville University Policy for Responsible Use of Electronic Resources.

Wireless access to the Internet is available throughout the campus.

Information Technology, through SafetyNet, provides technical assistance for connectivity and students' personal computers.

Assistance for any type of technology question is provided by the Technology Assistance Center (TAC). The TAC, located in the Boyer Building, provides telephone support for hardware and software questions, as well as walk-in support for faculty, staff and students. Visit the Information Technology web page, www.millersville.edu/infotech, for the TAC's available hours.

For complete details about the Information Technology staff, services provided, equipment in labs and much more, visit the Information Technology web page, www.millersville.edu/infotech, or phone (717) 871-7007.

SCIENCE AND MATHEMATICS FACILITIES

The Millersville University Argires Science Complex includes the 88,000-square-foot Caputo Hall (constructed in 1999), the 55,000-square-foot Roddy Hall (renovated in 2001), Brossman Hall and Nichols House. The complex includes 42 teaching laboratories, 39 individual student research laboratories, specialized support laboratories, 11 classrooms, four lecture halls, a student study lounge, a student café and lounge, seminar and conference rooms, and faculty offices. Classrooms are all outfitted with multimedia technology. The Department of Computer Science has two computer teaching laboratories: the human-computer interaction laboratory and the graphics, virtual reality and haptics laboratory. There are over 300 computers located throughout the science facilities for student use. This is one of the finest science facilities in the region; it houses programs in biology, chemistry, computer science, earth sciences, physics and nursing.

Wickersham Hall, home of the Department of Mathematics, houses departmental and faculty offices, as well as a mathematics computer laboratory with 36 networked PCs, each loaded with an array of mathematical software, including the Mathematica computer algebra system and the Minitab and SAS statistical software packages. Wickersham also has student study areas, a conference room, dedicated space for mathematics tutoring and eight classrooms. It was completely renovated in 2006.

Millersville University has an extensive inventory of modern instrumentation that students use in classroom work and for independent study and research. Included are four large environmental chambers, autoclaves, optical microscopes, an atomic force microscope, an optical polarizing microscope, a scanning electron microscope, several types of spectrophotometers (FT infrared, visible-ultraviolet, 400 MHz FT nuclear magnetic resonance, and atomic adsorption), a gas chromatograph/mass spectrometer, a Raman spectrometer, a scintillation counter, phase contrast microscopes, optical bench components, a vibration-isolating table for holography and optical interferometry, a cryogenics unit, an excimer laser, an X-ray spectrometer, a cosmic ray muon detector, electrophoresis equipment, thermocyclers, ultramicrotomes, high-speed and tabletop centrifuges and microfuges, laminar flow hoods, CO₂ incubators for tissue culture, ultralow freezers, an ultracentrifuge, several gas chromatographs, an electrochemical oxygen analyzer, an auto-analyzer, a high vacuum system, equipment for microwave behavior study, and hardware/software for data capture. Field equipment includes dissolved oxygen probes, flow meters, a backpack electroshocker, PIT tagging equipment, active infrared monitors, a fluorometer, digital cameras, video cameras, turbidity meters, a microbalance and extensive air sampling equipment. Additional science facilities include botanical glasshouses, a limnological research pond, the Keever ecological study area, several microcomputer-based laboratories, photographic darkrooms, and cold rooms. There are museum reference collections of mammals, birds, fishes, insects and other invertebrates, and modern animal-care facilities, including special aquatic “wet” rooms for maintenance of animals and research. There is an extensive botanical collection.

Millersville University meteorology has assembled a suite of instruments and associated equipment in support of boundary layer (BL) and atmospheric chemistry research and education. The BL component of this facility, referred to as the Millersville University Atmospheric Boundary Layer (MABL) facility, is mobile and has been deployed for several field projects from Philadelphia to California. MABL consists of the following: Rawinsonde and Tethered Balloon Sounding systems; Scintec MFAS Acoustic Sodar with radio acoustic sounder; Sigma Space micropulse LiDAR with cross-polarization; a 10-meter flux tower; trace gas analyzers and particle-scattering instruments; and trailer. Millersville also has its own Weather Research and Forecasting (WRF) Modeling System that is used for operational forecasting and in support of the observational studies and throughputs over 100 Gb per day of satellite, radar, model, upper air, and surface data and data products. Millersville meteorology supports a modern Weather Center, complete with an electronic map wall and streaming video production.

The geology program has a license for the RockWorks software. Geophysical equipment includes a proton precession magnetometer, an Earth resistivity meter and a stacking seismograph with multiple geophones. The program has a sand-tank groundwater flow model and GMS-MODFLOW numerical groundwater modeling. The program also maintains a broadband seismograph that is part of the Lamont-Doherty Earth Observatory’s Cooperative Seismic Network. The Earth Surfaces Processes Laboratory maintains equipment needed for preparing rock and soil samples for chemical and mineralogical analyses. A full suite of field water-sampling equipment is available for studies involving the chemistry and sediment of surface water. This includes handheld pH and conductivity meters. A total surveying station is available for topographic studies requiring accurate determination of elevation and distance, such as is used in hydrologic and geophysical studies and for LiDAR-derived elevation validation.

The ocean science and coastal studies program maintains a dedicated remote sensing laboratory equipped with ENVI/IDL software and state-of-the-art LiDAR processing hardware and software, including Terrasolid, LP360, Global Mapper, LasTools and Microstation. The program also maintains two CTDs, including a Seabird SBE 25 equipped with LiCor light sensors, a backscattering sensor, a YSI oxygen sensor, a fluorometer, an acoustic current meter and a newly acquired portable weather station. Millersville University is a senior full member of the Chincoteague Bay Field Station (CBFS) at the Marine Science Center at Wallops Island, Virginia, with full access to facilities, including two monitor boats, the *R.V. Flatfish* and *R.V. Mollusk*. Both are approximately 45 ft. in length and are used primarily in the tidal creeks and backbay areas for trawling and sampling. The *R.V. Phillip N. Parker* is a 47-ft. crew vessel used mostly for cruises beyond the inlet and up to 25 miles offshore. CBFS also maintains a fleet of kayaks that allow access to cypress swamps, shallow tidal creeks and flats, and other areas where our motorized vessels cannot go.

The department also maintains two rotating tables to conduct experiments in geophysical fluid dynamics for teaching and research, a hydrogen-alpha solar telescope, a National Acid Deposition Program sampling site off campus, and a Geo-Graphics Lab running ARCVIEW, ARCGIS (3-D Analyst, Spatial Analyst, Geostatistical), and Watershed Modeling System.

STUDENT POLICIES

Students are expected to familiarize themselves with and abide by all student conduct regulations found in this catalog and other University publications, including the *Student Code of Conduct*, the *Living on Campus Handbook* and the *Student Handbook*. Please refer to the *Student Handbook* for information on student discrimination grievance procedures, sexual harassment policy, and policy on sales and vendors.

IDENTIFICATION CARD

Enrolled students are required to have a Millersville University identification card. The card is needed for facility access and for the use of many campus services and activities.

Identification cards may be obtained at the campus I.D. office in the lobby of the Boyer Building. There is no charge for the first card, and the current fee for replacement is posted in the campus I.D. office.

Office hours are Monday through Friday, 8 a.m. to 4 p.m. Hours are extended at the beginning of fall and spring semesters and are posted at the I.D. office.

MOTOR VEHICLES

All vehicles parked on the properties of Millersville University must display a valid University-issued parking permit. Permits may be secured at the University Police Parking Division, located at Lebanon House (237 N. George St., rear lower level).

Violations of University parking regulations may result in parking violation tickets and possible disciplinary action, including cancellation of parking privileges, the withholding of grades and the denial of registration privileges. Parking sections of the Pennsylvania Vehicle Code (Title 75) are also enforced on the properties of Millersville University.

The Parking Division will utilize a waiting list in the event RESIDENT student parking reaches capacity for students who live in University residence halls. Office hours are Monday through Friday from 8 a.m.-4:30 p.m. Hours are extended at the beginning of the fall and spring semesters and are posted at the University Police Department.

PRIVACY OF STUDENT RECORDS

The Family Educational Rights and Privacy Act of 1974 was amended in December 2008 by the U.S. Department of Education. It gives students the right to review their academic records, to challenge their contents and to protect their confidentiality. Basic directory information may be disclosed without prior consent of the student. In the event of an alcohol-related incident or a health/safety emergency, parents may be considered appropriate parties to whom a nonconsensual disclosure may be made.

Millersville's policy on the confidentiality of student records is available from the vice president for enrollment management. Directory information is used to report student achievements in academic, athletic and extracurricular activities through appropriate media. Students may request that such information not be released by filing a written request during the first two weeks of each semester with the Office of the Registrar, Lyle Hall.

Annual notification of the University's policy on confidentiality of student records is also posted on the registrar's website.

Students may file complaints about the contents of their records or alleged wrongful disclosures of information with the vice president for Student Affairs and Enrollment Management.

SMOKING

Smoking is prohibited inside all campus buildings.

ACADEMIC HONESTY POLICY

Students of the University are expected to be honest and forthright in their academic endeavors. To falsify the results of one's research, to steal the words or ideas of another, to cheat on an examination, or to allow another person to commit or assist another in committing an act of academic dishonesty corrupts the essential process by which knowledge is advanced.

Actions that Violate the Academic Honesty Policy

The below lists are for illustration only. They should not be construed as restrictive or exhaustive enumeration of the various forms of conduct that constitute violation of the academic honesty policy.

Plagiarism

Plagiarism is the inclusion of someone else's words, ideas or data as one's own work. When an individual submits work that includes the words, ideas or data of others, the source of that information must be acknowledged through complete, accurate and specific references, and if verbatim statements are included, through quotation marks or other accepted citation practices. By placing his/her name on a scholarly product, the student certifies the originality of all work not otherwise identified by appropriate acknowledgments. Plagiarism would thus include representing as one's own any academic exercise (e.g., written work, computer program, sculpture, etc.) prepared totally or in part by another. An individual will avoid being charged with plagiarism if there is an acknowledgment of indebtedness whenever one:

1. quotes another person's actual words;
2. uses another person's ideas, opinions or theories, even if they are completely paraphrased in one's own words;
3. borrows facts, statistics or other illustrative materials, unless the information is common knowledge.

These guidelines should be followed for all source types, including books, newspapers, pamphlets, journal articles, websites and other online resources. *The above lists are for illustration only. They should not be construed as restrictive or exhaustive enumeration of the various forms of conduct that constitute violations of the academic honesty policy.*

Fabrication

Fabrication is the falsification of research or other findings. *The below lists are for illustration only. They should not be construed as restrictive or exhaustive enumeration of the various forms of conduct that constitute violation of the academic honesty policy.*

1. Citation of information not taken from the source indicated.
2. Listing in a bibliography sources not actually consulted.
3. Inventing data or other information for research or other academic projects.

Cheating

Cheating is the act or attempted act of deception by which an individual tries to misrepresent that he/she has mastered subject matter in an academic project, or the attempt to gain an advantage by the use of illegal or illegitimate means. *The below lists are for illustration only. They should not be construed as restrictive or exhaustive enumeration of the various forms of conduct that constitute violation of the academic honesty policy.*

1. Copying from another student's test paper.
2. Allowing another student to copy from one's test paper.
3. Using the course textbook, or other material such as a notebook, brought to class meetings but unauthorized for use during a test.
4. Collaborating during a test with another person by receiving or providing information without the permission of the instructor.
5. Using or possessing specifically prepared, unauthorized materials during a test (e.g., notes, formula lists, formulas programmed into calculators, notes written on the student's clothing or person).

Academic Misconduct

Academic misconduct is the violation of University policies by tampering with grades or participating in the distribution of any part of a test before its administration. *The below lists are for illustration only. They should not be construed as restrictive or exhaustive enumeration of the various forms of conduct that constitute violation of the academic honesty policy.*

1. Stealing, buying or otherwise obtaining all or part of an unadministered test.
2. Selling or giving away all or part of an unadministered test, including answers to an unadministered test.
3. Bribing, or attempting to bribe, any other person to obtain an unadministered test or any information about the test.
4. Buying, or otherwise acquiring, another's course paper and submitting it as one's own work, whether altered or not.
5. Entering a building, office or computer for the purpose of changing a grade in a grade book, on a test or on other work for which a grade is given.
6. Changing, altering or being an accessory to changing and/or altering a grade in a grade book, on a test, on a "Change of Grade" form or other official academic University record which relates to grades.
7. Entering a building, office or computer for the purpose of obtaining an unadministered test.
8. Continuing to work on an examination or project after the specified allotted time has elapsed.
9. Taking a test or course for someone else or permitting someone else to take a test or course in one's place.
10. Giving or taking unauthorized aid in a take-home exam or paper.
11. Submitting work for a class that was already submitted for another class, when unauthorized, or allowing another student to submit or copy from your previously submitted classwork.

What can students do to protect themselves from being charged with violations of the Academic Honesty Policy?

- 1) Prepare thoroughly for examinations and assignments; this also implies attending class on a regular basis.
- 2) Take the initiative to prevent other students from copying your exams or assignments (e.g., shield your answer sheet during examinations; don't lend assignments to other students for them to copy and turn in).
- 3) Check your instructor's course syllabus for a section dealing with academic honesty for that course and information on what style sheets or standards manuals to use, etc. If you can't find such a section, ask the instructor about expectations in this area. Instructors should issue clear guidelines at the beginning of a course as to what constitutes dishonesty; ultimately, however, it is the student's responsibility to clear up any uncertainties ahead of time.
- 4) Don't look in the direction of other students' papers during examinations.
- 5) Use a recognized handbook for instruction on citing source materials in papers. Consult with individual instructors or academic departments when in doubt.
- 6) Make use of tutorial services, or other services that may be available, to assist in preparing papers and completing other course assignments properly.
- 7) Discourage dishonesty among other students.
- 8) Refuse to assist students who cheat.

Actions which may be taken for violation of the Academic Honesty Policy:

When a faculty member suspects that an act of academic dishonesty has occurred, he/she will meet with the student to:

- a) discuss the alleged act;
- b) hear any defense the student may have;
- c) discuss any proposed academic sanctions;
- d) inform the student of his/her right to appeal faculty-imposed sanctions to the department chair and/or dean of the school.

Academic sanctions that may be imposed by the faculty member include:

- a) a verbal reprimand;
- b) a written reprimand;
- c) requiring the student to redo/resubmit the assignment, test or project;
- d) lowering the grade for the assignment, test or project.

Academic sanctions that require a formal charge be filed with the Associate Provost for Academic Administration include:

- a) any sanction in excess of lowering the grade for an assignment, test or project;
- b) failing the student for the course;
- c) recommending temporary or permanent suspension from the academic major or University.

Faculty members are encouraged to submit a report for each violation of the Academic Honesty Policy to the Associate Provost for Academic Administration regardless of the academic sanction imposed or requested. If more than one such report is filed for a student, even in the case of sanctions imposed only by the faculty member, then the Associate Provost for Academic Administration will meet with the student to discuss these occurrences and possibly impose additional academic sanctions.

Confidentiality

In accordance with the provisions of the Family Educational Rights and Privacy Act of 1974, any information relating to an alleged violation of the University's Student Code of Conduct or to the outcome of a judicial hearing must be treated as strictly confidential by members of the faculty.



ACADEMIC PROGRAMS

Millersville University

MILLERSVILLE UNIVERSITY 2016 - 2017

UNDERGRADUATE PROGRAMS

Millersville offers 61 undergraduate degree programs leading to an associate or baccalaureate degree, as well as minor programs. Many majors offer options for fulfilling requirements. These programs and options, subject to change, are listed on the following pages. Teaching certification grades are given in parentheses. The specific requirements for each program are given on the following pages under the department offering the program.

**Changes to the certifications and the certification programs are anticipated at the direction of the Pennsylvania Department of Education.*

BACCALAUREATE DEGREES

BACCALAUREATE DEGREE OPTIONS	DEPARTMENT
Allied Health Technology B.S. Medical Technology (Clinical/Medical Laboratory Science) Nuclear Medicine Technology Pre-Athletic Training Respiratory Therapy	Biology
Anthropology B.A. Archeology	Sociology/Anthropology
Applied Engineering & Technology Management B.S. Advanced Manufacturing Technology Automation & Intelligent Robotics Engineering Technology Computer-Aided Drafting/Design Technology Construction Technology General Industrial Technology Graphic Communication Technology Nanofabrication Manufacturing Technology Robotics & Control Systems Technology	Applied Engineering, Safety & Technology
Art B.A.	Art & Design
Art B.F.A.	Art & Design
*Art Education B.S.Ed. (PreK-12) Art K-12 with Inclusive Education	Art & Design
Biology B.A.	Biology
Biology B.S. Animal Behavior Botany Environmental Biology Marine Biology Medical Technology (Clinical/Medical Laboratory Science) Molecular Biology/Biotechnology Nuclear Medicine Technology Pre-Athletic Training Pre-Optometry Pre-Podiatry Respiratory Therapy	Biology
*Biology B.S.Ed. (7-12) Biology with Inclusive Education 7-12	Biology
Business Administration B.S. Accounting Finance International Business Management Marketing	Business Administration (Accounting & Finance/Management & Marketing)

*Changes to the certifications and the certification programs are anticipated at the direction of the Pennsylvania Department of Education.

Chemistry B.A.	Chemistry
Chemistry B.S. Biochemistry Environmental Chemistry Nanotechnology Polymer Chemistry Pre-pharmacy	Chemistry
*Chemistry B.S.Ed. (7-12) Chemistry with Inclusive Education 7-12	Chemistry
Computer Science B.S.	Computer Science
Early Childhood Education B.S.Ed. (PreK-4) Special Education PreK-8/Early Childhood (PreK-4) Dual Major	Early, Middle & Exceptional Education
Earth Sciences B.A. Environmental Geology	Earth Sciences
*Earth Sciences B.S.Ed. (7-12) Earth Science with Inclusive Education 7-12	Earth Sciences
Economics B.A. Financial Economics Political Economy Quantitative	Economics
English B.A. Comparative Literature English as a Second Language Film Studies Linguistics Print Journalism Writing Studies	English
*English B.S.Ed. (7-12) Comparative Literature English as a Second Language English with Inclusive Education 7-12 Film Studies Linguistics Print Journalism Writing Studies	English
French B.A. International Business	Foreign Languages
*French B.S.Ed. (PreK-12) French K-12 with Inclusive Education 7-12 International Business	Foreign Languages
Geography B.A. Environmental Studies Geospatial Applications Global Studies	Geography
Geology B.S.	Earth Sciences
German B.A. German K-12 with Inclusive Education 7-12 International Business	Foreign Languages

*Changes to the certifications and the certification programs are anticipated at the direction of the Pennsylvania Department of Education.

*German B.S.Ed. (PreK-12) International Business	Foreign Languages
Government & Political Affairs B.A.	Government & Political Affairs
History B.A.	History
History B.S.Ed. (7-12)	History
Industry & Technology (See Applied Engineering, Safety & Technology)	
Interactive & Graphic Design B.Des.	Art & Design
International Studies B.A.	Multidisciplinary
Mathematics B.A. Actuarial Science Statistics	Mathematics
Mathematics B.S. Actuarial Science Applied Mathematics Statistics	Mathematics
*Mathematics B.S.Ed. (7-12) Actuarial Science Mathematics with Inclusive Education 7-12 Statistics	Mathematics
Meteorology B.S.	Earth Sciences
Middle-Level Education (Grades 4-8) B.S.Ed. Language Arts (Grades 4-8) Mathematics (Grades 4-8) Science (Grades 4-8) Social Studies (Grades 4-8)	Early, Middle & Exceptional Education
Multidisciplinary Studies B.A. Applied Disability Studies Digital Journalism Educational Studies Entertainment Technology Humanities Environmental Hazards & Emergency Management Science & Mathematics Social Sciences Sports Journalism	Multidisciplinary
Music B.A. Music Business Technology	Music
*Music Education B.S.Ed. (PreK-12) Music K-12 with Inclusive Education 7-12	Music
Nursing B.S.N.	Nursing
Occupational Safety & Environmental Health B.S.	Applied Engineering, Safety & Technology
Ocean Sciences & Coastal Studies B.S. Physical Oceanography	Earth Sciences
Philosophy B.A.	Philosophy

Physics B.A. Computer Science Cooperative Engineering Meteorology Nanotechnology Philosophy Polymer Chemistry	Physics
Physics B.S.	Physics
*Physics B.S.Ed. (7-12) Physics with Inclusive Education 7-12	Physics
Psychology B.A.	Psychology
*Social Studies B.S.Ed. (7-12) Economics Economics with Inclusive Education 7-12 Geography Geography with Inclusive Education 7-12 Government Government with Inclusive Education 7-12 History History with Inclusive Education 7-12	Multidisciplinary
Social Work B.A.	Social Work
Sociology B.A. Criminology	Sociology/Anthropology
Spanish B.A. Spanish K-12 with Inclusive Education 7-12 International Business	Foreign Languages
*Spanish B.S.Ed. (PreK-12) International Business	Foreign Languages
Speech Communication B.S. Broadcasting Communication Studies Public Relations Theatre	Communication & Theatre
*Technology and Engineering Education B.S.Ed. (PreK-12) Engineering Design Education Technology and Engineering K-12 with Inclusive Education	Applied Engineering, Safety & Technology

ASSOCIATE DEGREE

ASSOCIATE DEGREE OPTIONS

DEPARTMENT

Applied Engineering & Technology A.T. Advanced Manufacturing Technology Computer-Aided Drafting/Design Technology Construction Technology Electronics/Control Systems Technology Graphic Communication Technology Nanofabrication Manufacturing Technology Occupational Safety & Hygiene Technology	Applied Engineering, Safety & Technology
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MINORS AND OPTIONS

MINOR OPTIONS	DEPARTMENT
African-American Studies	Multidisciplinary
Anthropology Archaeology Cultural Anthropology General Anthropology	Sociology/Anthropology
Art Art History Photography Studio Art	Art & Design
Applied Engineering & Technology Management Advanced Manufacturing Technology Computer-Aided Drafting/Design Technology Construction Technology Control Systems Technology General Applied Engineering & Technology Graphic Communication Technology Integrated STEM Education Methods	Applied Engineering, Safety & Technology
Athletic Coaching	Wellness & Sport Sciences
Biochemistry	Chemistry
Biology	Biology
Business Administration Accounting Finance General Business Management Marketing	Business Administration (Accounting & Finance/Management & Marketing)
Chemistry	Chemistry
Computer Science	Computer Science
Criminology	Sociology/Anthropology
Earth Sciences	Earth Sciences
Economics General Economics Technical Economics	Economics
Environmental Environmental Policy and Regulation Industrial and Environmental Health Land Use Quantitative Methods in Environmental Science Water Resources	Multidisciplinary
Environmental Chemistry	Chemistry
Environmental Hazards and Emergency Management	Multidisciplinary
English American Literature British Literature Film Studies General English	English

Entrepreneurship	Multidisciplinary
French	Foreign Languages
Geography Environmental Geography General Geography Geospatial Applications Global Geography	Geography
Geology	Earth Sciences
German	Foreign Languages
Gerontology	School of Social Work
Government & Political Affairs	Government & Political Affairs
Heliophysics and Space Weather	Earth Sciences & Physics
History	History
Industry & Technology (See Applied Engineering, Safety & Technology)	
International Studies	Multidisciplinary
Latin	Foreign Languages
Latina(o) Studies	Multidisciplinary
Mathematics	Mathematics
Meteorology	Earth Sciences
Molecular Biology/Biotechnology	Biology
Music	Music
Occupational Safety & Environmental Health	Applied Engineering, Safety & Technology
Oceanography	Earth Sciences
Philosophy	Philosophy
Physics	Physics
Psychology	Psychology
Sociology	Sociology/Anthropology
Spanish	Foreign Languages
Statistics	Mathematics
Theatre	Communication & Theatre
Women's Studies	Multidisciplinary

GRADUATE PROGRAMS

Millersville offers doctoral and master's degree programs as well as post-baccalaureate and post-master's certification programs. These programs, subject to change, are as follows:

MASTER'S DEGREES

MASTER'S DEGREES	DEPARTMENT
Art Education M.Ed.	Art & Design
Assessment, Curriculum and Teaching Online Instruction Integrative STEM Education	Educational Foundations
Early Childhood Education M.Ed.	Early, Middle & Exceptional Education
Emergency Management M.S.	Center for Disaster Research & Education
English M.A. and M.Ed.	English
Gifted Education M.Ed.	Early, Middle & Exceptional Education
History M.A.	History
Integrated Scientific Applications M.S. Climate Science Applications Environmental Systems Management GeoInformatics Weather Intelligence and Risk Management	Multidisciplinary
Language & Cultures M.A. French German Spanish	Foreign Languages
Language and Literacy Education M.Ed. English as a Second Language	Early, Middle & Exceptional Education
Leadership for Teaching and Learning M.Ed.	Educational Foundations
Mathematics M.Ed.	Mathematics
Nursing M.S.N. Family Nurse Practitioner Nursing Education	Nursing
Psychology School Counseling M.Ed. Clinical Psychology M.S. School Psychology M.S.	Psychology
Social Work M.S.W.	Social Work
Special Education Special Education M.Ed. Special Education PreK-8 M.Ed. Special Education 7-12 M.Ed.	Educational Foundations
Sport Management M.Ed. Athletic Coaching Athletic Management	Wellness & Sport Sciences
Technology & Innovation M.Ed.	Applied Engineering, Safety & Technology

DOCTORAL DEGREES

DOCTORAL DEGREES	DEPARTMENT
Educational Leadership Ed.D.	Educational Foundations
Nursing Practice DNP	Nursing
Social Work DSW	Social Work

POST-BACCALAUREATE AND POST-MASTER'S CERTIFICATION AND CERTIFICATE PROGRAMS

Instructional Certification

Art (K-12)
Biology (7-12)
Chemistry (7-12)
Early Childhood Education (PreK-4)
Earth Sciences (7-12)
English (7-12)
French (K-12)
German (K-12)
Mathematics (7-12)
Middle-Level Grades 4-8
Music Education (K-12)
Online Instruction Endorsement
Physics (7-12)
Program Specialist-ESL (*requires Instructional I certification*)
Reading Specialist (*requires Instructional I certification*), (K-12)
School Nurse (*requires a bachelor's degree*)
Social Studies (7-12)
Spanish (K-12)
Special Education (PreK-8); Special Education (7-12) (*requires an instructional certification that covers the grade span for which they are seeking SPED certification*)
STEM Endorsement
Technology & Innovation (K-12)

Post-Master's Millersville Certificate

Family Nurse Practitioner
Nursing Education

Post-Baccalaureate Millersville Certificate

Gifted Education
Letter of Completion in Coaching Education
Respiratory Therapy
Writing

Post-Master's Certification

Elementary Guidance
Principal K-12
School Psychology
Secondary Guidance

Supervisory Certification

Art Education
Communication Arts
Curriculum & Instruction K-12
Elementary Education
Foreign Languages
Mathematics
Music Education
Reading Education
School Guidance Services
School Health Services
School Psychological Services
Science
Social Studies
Special Education

PDE Endorsement Programs

Online Instruction Endorsement
Integrated STEM Education Endorsement

UNDERGRADUATE PROGRAMS OF STUDY

In the following course listings, G1, G2 and G3 refer to general education courses approved to satisfy the Critical Thinking Across the Liberal Arts requirement.

G1 Course counts in Humanities and Fine Arts block

G2 Course counts in Science and Mathematics block

G3 Course counts in Social Sciences block

The symbols D, L, P, W and AW indicate additional educational components contained in the course. The symbols are defined as follows:

D A cultural diversity and community course

L A lab course

P A perspectives course

W A significant writing component

AW An advanced writing course

For more information on these components of the general education program, refer to the section in the catalog entitled *The General Education Program*.

FREQUENCY OF COURSE OFFERINGS:

- When a course is always offered in fall, spring and summer, no notation is shown.
- When a course is listed as "Offered. . .," it is offered only in the semesters noted.
- When a course is listed as "Offered periodically," it is offered on an irregular or as-needed basis.
- When a course is listed as "Offered infrequently," the course has not been offered for two years and will not be offered for two more years.
- When a course is listed as "Offered annually," the course is taught in either spring or fall.

ACCOUNTING

See Business Administration

ACTUARIAL SCIENCE

See Mathematics

ADVANCED MANUFACTURING TECHNOLOGY

See Applied Engineering, Safety & Technology

AFRICAN-AMERICAN STUDIES

Professor Smith-Wade-El, director

African-American Studies is an 18-credit interdisciplinary minor focusing on the history and socio-culture of African Americans. The minor offers an introduction to issues, theories and research concerning African Americans in various disciplines. Courses in the minor emphasize African-American perspectives, as well as the development of critical thinking and written and oral communication skills. The minor will present opportunities to examine, compare and contrast African-American perspectives with those of other American cultures. It offers students in a variety of disciplines important perspectives on African-American history and culture that will help them to understand the possibilities and values of cultural differences. Students will be encouraged to connect issues about African-American culture raised in the classroom to current society. Fifteen of the 18 credits satisfy general education requirements, and knowledge of African-American culture will complement many majors, especially elementary and secondary education, business, communication & theatre, English, history, sociology, art, music, and industry & technology. It appears to be both essential and beneficial that all students have a multicultural perspective of themselves and the world around them.

African-American Studies Minor: 18 s.h.

Required courses: AFAM 201, AFAM 401, HIST 272 or HIST 273, and ENGL 333 or ENGL 334, plus two electives from an approved list, at least one of which must be at the 300 level or above.

COURSE DESCRIPTIONS

AFAM 201: 3 s.h.

Introduction to African-American Studies (D, G3)

Provides an overview of African-American culture and history. African-American perspectives and contributions in the areas of literature, art, theatre, music, politics, economics, science and technology, medicine, male-female relationships, family, the church and the media will be presented. Offered annually.

AFAM 401: 3 s.h.

Senior Seminar in African-American Studies

An examination and discussion of current research issues in African-American studies. May be taken in conjunction with a 2 to 3 credit independent study.

AFAM 496: 3 s.h.

Topics in African-American Studies

Presents a detailed investigation on a topic of current interest in African-American studies. Topics will be announced.

APPROVED AFRICAN-AMERICAN STUDIES COURSES

Descriptions of these courses may be found under the appropriate departmental listing. No more than one course may be taken from the same discipline grouping (the four groupings are humanities, social sciences, science and mathematics, and education).

ANTH 226: 3 s.h.

Comparative Societies (G3, W)

HIST 272: 3 s.h.

African-American History I (G3, W)

HIST 273: 3 s.h.

African-American History II (G3, W)

ENGL 333: 3 s.h.

African-American Literature I (G1, W)

ENGL 334: 3 s.h.

African-American Literature II (G1, W)

ANTH 344: 3 s.h.

Gender, Race & Class (P)

EDUC 403: 3 s.h.

Cultural Diversity (D, W)

EDUC 433: 3 s.h.

Gender & Race Issues in Children's Literature (D, P)

ENGL 347: 3 s.h.

Studies of Ethnicity in Film (G1, W)

ENGL 429/629: 3 s.h.

Black Women Writers

HIST 401: 3 s.h.

Cultural Interactions in the Atlantic: 1450-1820 (P)

HIST 494/ENGL 494/MUSI 494: 3 s.h.

Perspectives on the Harlem Renaissance (P)

MATH 102: 3 s.h.

Survey of Mathematical Ideas in Nonwestern Cultures (D, G2)

MUSI 369: 3 s.h.

Introduction to West African Music and Dance

PSYC 318: 3 s.h.

Psychology of Racism (D, P)

PSYC 319: 3 s.h.

Psychology of African Americans (G3, W)

SOCY 307: 3 s.h.

African-American Social Thought (G3, W)

SOCY 441: 3 s.h.

Urban Sociology

SOWK 313: 3 s.h.

Family Violence (P)

SOWK 350: 3 s.h.

Encounter in Human Diversity (D, P)

SSCI 212: 3 s.h.

The Black Woman (G3)

ALLIED HEALTH TECHNOLOGY

See Biology

ANTHROPOLOGY

See Sociology/Anthropology

APPLIED ENGINEERING, SAFETY & TECHNOLOGY

College of Science and Technology

Professor Litowitz, chairperson
 Professor Brusic, EDTE coordinator
 Associate Professor Snyder, AETM coordinator
 Assistant Professor Ogutu, OSEH coordinator
 Professor Wright, Engineering Technology Coordinator
 Professors Bell, David, DeLucca, McCade, Specht, Wright
 Associate Professor Warner
 Assistant Professors Atwater, Karan, Khalighi, Manfredi, Painter

The Department of Applied Engineering, Safety & Technology (AEST) offers nationally accredited programs of study leading to an A.T. in Applied Engineering & Technology or a B.S. in Applied Engineering & Technology Management, a B.S. in Occupational Safety & Environmental Health, and a B.S.Ed. in Technology Education. Minors are offered in Applied Engineering & Technology, and Occupational Safety & Environmental Health. A post-baccalaureate technology education teacher certification program is also offered.

Students may participate in the activities of the Technology & Engineering Education Collegiate Association; Association of Technology, Management and Applied Engineering; Society of Manufacturing Engineers; American Society of Safety Engineers; Robotics Team; Submersible Research Team; and Marauder Graphics Club. An invitation to join Epsilon Pi Tau, the international honor society for professions in technology, may also be extended to department majors who excel.

Qualified department majors pursuing a bachelor's degree may earn departmental honors by proposing, conducting and defending thesis research. Eligibility for graduation with AEST departmental honors includes having a minimum CGPA of 3.0 overall, with 3.35 in the major, and a grade of B or higher on an honors thesis. Contact the department chairperson for guidelines and an enrollment application to participate in the department's honors program.

Applied Engineering & Technology (AETE), A.T.

The associate degree program prepares technicians with the liberal arts, technological literacy and technical preparation for either direct employment or the seamless continuation in a bachelor's degree program in applied engineering & technology management (AETM) or occupational safety & environmental health (OSEH). Technical concentrations in the associate of technology program include advanced manufacturing, computer-aided drafting and design (CADD), construction, control systems, graphic communications, nanofabrication and occupational safety.

Applied Engineering & Technology Management (AETM), B.S.

The Bachelor of Science degree program prepares applied engineers, technologists and technical managers with qualifications in general education, technological literacy, a technical option and management. Technical concentrations are available in advanced manufacturing, CADD, construction, general technology, graphic communications, nanofabrication, and robotics and control systems. The Association of Technology, Management & Applied Engineering (ATMAE) has accredited this program.

Supervised technical and management-oriented internships in industry are elective in both the A.T. and B.S. programs to enable relevant work experiences and the transition into employment. Managers who represent the technical concentrations serve as an advisory committee for the program. Graduates are commonly employed in design, production, training, sales and service careers in business, industry, education and government.

An Applied Engineering & Technology minor complements majors in art, business, speech communication, computer science, economics, physics and OSEH. This minor enables specialization in several of the baccalaureate-degree technical concentrations.

Automation & Intelligent Robotics Engineering Technology (ARET), B.S.

Students in the ARET degree are introduced to the fundamentals of power, electronic systems and formal programming techniques common in industry. The curriculum, supported jointly by the departments of Applied Engineering, Safety & Technology and Computer Science, includes in-depth technical content of electronics, control systems, mechanical systems, and computer programming and applications to prepare professionals equipped to design, improve, maintain, and manage robotic and automated process and control systems. Laboratory courses require students to design, program, develop and construct projects independently and in small teams.

The study of robotics and controls involves the design, modeling, optimization, documentation and automation of advanced control problems. This major is designed to produce graduates prepared to work with multiple types of technology to design and implement projects that have advanced programming needs. Typical entry-level professions include software engineers, research & development engineers, systems engineers, computer engineers, process engineers, control systems engineers, controls technicians, field engineers, manufacturing engineers, robotics programmers and robotics technicians.

Occupational Safety & Environmental Health (OSEH), B.S.

The OSEH program is designed for persons interested in the safety, industrial hygiene and environmental health professions. OSEH includes general education studies, with emphasis on the sciences and core studies in the technical and managerial aspects of industrial safety and hygiene. An internship is required in industry or in an insurance or government agency. Continuous improvement of the program is guided by an advisory committee of safety professionals. Graduates of this program typically work as safety and health managers, industrial hygienists, loss-control consultants, compliance officers and environmental safety specialists. The OSEH minor should be an attribute to majors in biology, business administration, chemistry, applied engineering & technology management, political science and nursing. OSEH is nationally accredited by the Accreditation Board for Engineering and Technology (ABET).

Technology & Engineering Education (TECE), B.S.Ed.

The TECE program is a teacher preparation program for persons seeking Pennsylvania teacher certification in technology education, K-12.

The three themes of professional education at Millersville are supported and implemented, including engagement in learning communities of inquiry and action, a focus on students and demonstration of exemplary professional practices. Professional dispositions are developed and assessed in communicating professionally, demonstrating professional growth, demonstrating professional relationships, exhibiting attributes suitable to the profession, and displaying responsible and ethical behavior.

TECE majors are broadly prepared in general education, technology and professional teacher education. Emphasis is on understanding, applying, managing and assessing design, biorelated, communication, energy and power, transportation and production technologies. Students may specialize in a technical area of their choice and must devote one semester to full-time student teaching in a public school.

An advisory committee of technology and engineering education teachers and supervisors assists with providing program relevancy. This program is accredited and nationally recognized as an outstanding technology teacher education program by the International Technology and Engineering Educators Association/Council on Technology and Engineering Teacher Education.

COURSE REQUIREMENTS**Applied Engineering & Technology (AETE) Major (A.T.): 61-65 s.h.**

Technical Concentration (choose one):

- Advanced Manufacturing (30 credits): ITEC 130, 241, 261, 271, 281, 325, 342; OSEH 120; one of ITEC 375 or 376; one of ITEC 300, 382, 425 or 448. Additional required related courses (7-8 credits): one of PHYS 103, 104, 131; one of MATH 130, 151, 160, 161.
 - CADD (30 credits): ITEC 130, 241, 342, 344, 346; OSEH 120; select four from ITEC 110, 120, 243, 245, 300, 345, 446, 448. Additional required related courses (7-8 credits): one of PHYS 103, 104, 131; one of MATH 130, 151, 160, 161.
 - Construction (30 credits): ITEC 110, 120, 130, 241, 271, 331, 332, 346; OSEH 120; one of ITEC 300, 326, 342 or 376. Additional required related courses (7-8 credits): one of PHYS 103, 104, 131; one of MATH 130, 151, 160, 161.
 - Control Systems (30 credits): ITEC 130, 241, 261, 262, 325, 326, 342; OSEH 120; select two of ITEC 300, 364, 425, 427, 466, 467. Additional required related courses (7-8 credits): one of CHEM 101, 103, 205, PHYS 103, 104; one of MATH 151, 160, 161.
 - Graphic Communication (30 credits): ITEC 110, 251, 252, 351, 355, 356; OSEH 120; select three from ITEC 241, 243, 300, 357, 455. Additional required related courses (6-8 credits): one of CHEM 101, 103, 111, 205, PHYS 103, 104, 131; one of MATH 130, 151, 160, 161.
 - Nanofabrication Manufacturing (33 credits): ITEC 110, 120, 130, 261; OSEH 120; NFMT 311, 312, 313, 314, 315 and 316. The six NFMT courses comprise a full semester of hands-on experience in state-of-the-art equipment and clean-room laboratories in the nanofabrication facility at Penn State University in State College. Additional required related courses (10-11 credits): CHEM 103; one of PHYS 103, 104, 131; one of MATH 130, 151, 160.
 - Occupational Safety (30 credits): ITEC 120, 130; OSEH 120, 220, 221, 320, 321, 323; CHEM 104; select one of OSEH 333, 410, 422, ITEC 300, or ITEC 392. Additional required related courses (10-12 credits): one of CHEM 103, 111; one of PHYS 103, 104, 131; one of MATH 130, 151, 160.
- Additional requirement for all concentrations: ENGL 312 or 316.

Applied Engineering & Technology Management (AETM) Major (B.S.): 120 s.h.

Technical Concentration (choose one):

- Advanced Manufacturing (36 credits): ITEC 120, 130, 241, 271, 281, 325, 342, 375, 376, 382, 425 and 448.
- CADD (36 credits): ITEC 110, 120, 130, 241, 243, 245, 342, 344, 345, 346, 446 and 448.
- Construction (36 credits): ITEC 110, 120, 130, 241, 271, 331, 332, 345, 346, 356 and 433; one from ITEC 326, 342 or 376.
- General Technology (36 credits): ITEC 110, 120, 130 and 241; select one of ITEC 251 or 252; ITEC 261, 271 and 281; select one of ITEC 325 or 326; and three ITEC laboratory electives at the 300 level or above, including one research and development (R&D) course.
- Graphic Communication (36 credits): ITEC 110, 241, 251, 252, 344, 351, 355, 356, 357, 455, 457 and one related technical elective from ITEC 120, 130, 243, 245, 342, 498, 515, ART 133, 142, 240, 306, BUAD 231, COMM 206, 220.
- Nanofabrication Manufacturing (36 credits): ITEC 110, 120, 130, 241, 261, 262; NFMT 311, 312, 313, 314, 315, 316. The six NFMT courses comprise a full semester of hands-on experience in state-of-the-art equipment and clean-room laboratories in the nanofabrication facility at Penn State University in State College. Required science: CHEM 312. Required related economics: ECON 101 and 102. Required related science courses: Select one grouping from CHEM 103 and 104; or CHEM 111 and BIOL 100; or CHEM 111 and PHYS 103 or 104. Additional requirements: Technology Management Core (18 credits): OSEH 120, ITEC 400 or 498; ITEC 492 and 494; BUAD 251 and 452. Elective course in Technology Management (3 credits): Select one from ITEC 392; OSEH 221, 320, 321, 323, 333; BUAD 161, 352, 353, 357; PSYC 329; SOCY 318.
- Robotics & Control Systems (36 credits): ITEC 130, 241, 261, 262, 325, 326, 342, 364, 425, 427, 466 and 467. Additional requirements for all concentrations (except Nanofabrication Manufacturing, which is shown above) include:
- Management courses (24 credits required): Core (15 credits) of OSEH 120; ITEC 492 and 494; BUAD 251 and 452. Electives (9 credits) selected

from ITEC 300, 392, 400; OSEH 221, 320, 323, 333; BUAD 161, 352, 353, 357; PSYC 329; SOCY 318.

- Required related courses (22-24 credits): Economics (6 credits): ECON 101 and 102. Science (6-8 credits): two of CHEM 101, 103, 104, 205, PHYS 103 or 104, 131, 132. Mathematics (6-7 credits): MATH 130 and one of MATH 151, 160 or 161. ENGL 312 or 316.
- Recommended Perspectives course: ITEC 301, 302, 303 or 304.

Applied Engineering & Technology Minor: 18 s.h.

Select one of the following concentrations:

- Advanced Manufacturing: ITEC 130, 241, 271, 281; and two of ITEC 375, 376 or 382.
- CADD: ITEC 241 and five of ITEC 130, 243, 245, 342, 344, 345, 346, 446 or 448.
- Construction: ITEC 130, 241, 271; OSEH 120; and two of ITEC 331, 332 or 346.
- Control Systems: ITEC 261, 262, 325; and three of ITEC 130, 241, 326, 342, 364, 425, 427, 466 or 467.
- General Applied Engineering & Technology: ITEC 110, 120, 130, and three additional ITEC laboratory courses (two required at 300 level or above).
- Graphic Communication: ITEC 110, 251, 252; and three of ITEC 351, 355, 356, 357, 455 or 457.

Automation & Intelligent Robotics Engineering Technology (ARET), B.S.: 120 s.h.

Core requirements (60 credits required): ITEC 130, 241, 261, 262, 325, 326, 342, 364, 425, 427, 466, 467 and CSCI 140, 161, 162, 362, 450, 456.

Required related courses (18 credits): MATH 161 and 211, PHYS 231 and 232.

Recommended Perspectives course: ITEC 301, 302, 303 or 304.

Additional requirement for program (3 credits): ENGL 312 or 316

Occupational Safety & Environmental Health (OSEH) Major (B.S.): 120 s.h.

OSEH courses (44 credits required): OSEH 120, 220, 221, 320, 321, 323, 333, 410, 422, 435 and 440.

Required related courses (33 credits): BIOL 100, CHEM 103 and 104, PHYS 131 and 132, MATH 130 and 151, ITEC 130 and 392, and ENGL 312 or 316.

Occupational Safety Minor: 18 s.h.

OSEH courses (18 credits required): OSEH 120, 220, 221, 320, 323 and 410.

Technology & Engineering Education (EDTE) Major (B.S.Ed.): 129 s.h.

K-12 Teacher Certification

Technology literacy courses (12 credits required): ITEC 110, 120, 130, 140. Technical courses (36 credits required): ITEC 222, 241, one of 251 or 252, 261, one of 271 or 281, 327, 344, 346, 435 required and three advanced technical laboratory electives in communication, transportation/energy/power and/or production technology. Professional courses (27 credits required): EDTE 291, EDFN 211, 241 in the sophomore year; EDTE 391, SPED 346, EDSE 340 in the junior year; and EDSE 471, EDTE 461, 491 and 496 in the senior year. A 3.0 overall grade point average is required for entrance into Advanced Professional Studies (APS). A 2.80-2.99 overall grade point average will be accepted, with higher test scores required on the Praxis II exam in order to be eligible for certification.

Required related courses (15-16 credits): ENGL 312 or 316; one lab science course from BIOL, CHEM, PHYS or ESCI (BIOL 100, CHEM 103, CHEM 205, PHYS 103 or PHYS 104 are strongly recommended); two general education MATH courses and one general education ENGL literature course.

Recommended Perspectives course: ITEC 301, 302, 303 or 304.

Engineering Design Education Concentration

TECE majors may choose the Engineering Design Education concentration for better preparation to teach an engineering-focused or STEM (Science, Technology, Engineering & Math)-based curriculum.

Post-baccalaureate Teacher Certification in TECE

Refer to *Admission to Advanced Professional Studies and Certification (Education Majors)* in this catalog for more information. Undergraduate and graduate courses may be credited within this program.

Integrative STEM Education Methods Minors: 18 s.h.

For students who are majoring in Elementary & Early Childhood Education (ERCH) and dual majors in SPED.

Required courses are ERCH 110, ERCH 190, EDTE/ERCH 290, ITEC 344, EDTE 490/690, EDTE/ERCH 495.

COURSE DESCRIPTIONS

Applied Engineering & Technology

ITEC 110: 3 s.h.

Communication and Information Systems

Communication technology to design, compose, send, receive and understand ideas and information. Emphasis on graphic and electronic media. Experiences with graphic design, graphic reproduction, desktop publishing, web-page development, photography, and digital video and audio. 2 hrs. lec., 3 hrs. lab. Offered fall, spring.

ITEC 120: 3 s.h.

Energy and Power Systems

An introduction to energy and power systems. Principles of conventional and alternative energy resources and energy conservation, and electrical, fluid and mechanical power will be studied along with environmental concerns associated with power production. 2 hrs. lec., 3 hrs. lab.

ITEC 130: 3 s.h.

Production Materials and Processes

The integration and interrelationships of materials and processes for construction and manufacturing, including the application of math and scientific principles and the technological impacts on industry and society. Requires experiences in materials processing and production tooling. 2 hrs. lec., 3 hrs lab. Offered fall, spring.

ITEC 140: 3 s.h.**Biorelated Technologies**

Agriculture, medicine and other technologies in which living organisms are used to solve problems and modify products and systems. Includes problem solving, design and research activities for understanding biorelated technologies, issues and impacts. 2 hrs. lec., 3 hrs. lab. Reserved for EDTE majors. Offered fall, spring.

ITEC 222: 3 s.h.**Transportation & Automation**

A study of transportation and automation systems. Principles of land, air, space and marine transportation will be studied. Includes the investigation of a variety of control systems leading to automation and robotics. 2 hrs. lec., 3 hrs. lab. Prereq: ITEC 120.

ITEC 241: 3 s.h.**Drafting Communications**

Introductory technical sketching, conventional drafting and computer-aided drafting (CAD). Experiences with equipment use and care, lettering, geometric constructions, multiview projection, dimensioning, sectioning and pictorial representation. 2 hrs. lec., 3 hrs. lab. Offered fall, spring.

ITEC 243: 3 s.h.**Technical Sketching, Design & Rendering**

Freehand sketching and basic elements of two-dimensional design and rendering. Various sketching and shading techniques are developed. Elements and principles of design, methods of designing, and evaluation and design of products are included. An application software is used to render design sketches. 2 hrs. lec., 3 hrs. lab.

ITEC 245: 3 s.h.**Descriptive Geometry**

Advanced engineering graphics, with an emphasis on basic descriptive geometry, surface development drawings, intersection of solids and pictorial projection systems. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 241.

ITEC 251: 3 s.h.**Print Media Systems**

Contemporary resources, processes and impacts of graphic reproduction. Emphasis on workflows relative to offset lithography, flexography, gravure, digital printing and screen printing. Covers graphic design; digital-image composition; digital photography; scanning; prepress, press and postpress production. 2 hrs. lec., 3 hrs. lab. Offered fall, spring. Prereq: ITEC 110 or ART 244 or COMM 201 or by permission.

ITEC 252: 3 s.h.**Web Publishing Systems**

Planning, creating and publishing of web media. Topics include information design, optimization of graphic and audio files, navigation systems and website technologies. Multimedia authoring software will be utilized to produce and publish websites that include digital animations and interactive forms. 2 hrs. lec., 3 hrs. lab. Prereq: ITEC 110 or permission of instructor.

ITEC 261: 3 s.h.**Electronic Systems**

Survey of electricity and electronics, including typical direct current and alternating current applications, safe practices and technological impacts. Experiences include breadboarding, design and problem solving, use of test equipment and electronic project assembly/troubleshooting. 2 hrs. lec., 3 hrs. lab. Offered fall, spring.

ITEC 262: 3 s.h.**Semiconductor Electronics**

In-depth study of semiconductor theory, including diodes, transistors and silicon-controlled rectifiers. Emphasizes digital, linear and hybrid integrated circuits. Covers surface mount and emerging technologies, such as nanotechnology and biotechnology. Practical applications include prototyping circuits, design and problem solving, use of test equipment and troubleshooting. 2 hrs. lec., 3 hrs. lab. Offered fall, spring. Prereq: ITEC 261 or permission of instructor.

ITEC 271: 3 s.h.**Processing Nonmetallic Materials**

Various nonmetallic materials, processes, products and impacts, including polymers, ceramics, wood, clay, composites and glass. Instruction and experiences provided on safety and the use of tools and machines associated with nonmetallics. Includes production activities in each of the specified nonmetallic material areas. 2 hrs. lec., 3 hrs. lab. Offered fall, spring. Prereq: ITEC 130.

ITEC 281: 3 s.h.**Processing Metallic Materials**

Design, manufacturing and assembly of metallic products. Covers metallic material properties, metallurgy, heat treatment, alloying and impacts. Scientific and mathematical concepts are stressed to transform metallic materials into useful products. Includes safe utilization of associated tools and machines. 2 hrs. lec., 3 hrs. lab. Offered fall, spring. Prereq: ITEC 130.

ITEC 301: 3 s.h.**Technology and Its Impact on Humans (P)**

Analysis of the development of technology and its impact on humans and a realization of the importance of human technological behavior on the environment, social/cultural systems and the future. Students use analytical skills on a written independent research project, and oral skills to present and defend positions on technological problems facing our society. Prereq: COMM 100, ENGL 110 and junior class standing.

ITEC 302: 3 s.h.**Futurology: Technology, Society and Change (P)**

A nontechnical interdisciplinary course to help students identify and analyze forces causing technological and social change. Using an understanding of the processes of technological and social change and research techniques for forecasting the future, students complete a written independent research project. Develops skills to project future technological and social developments and their impacts. Offered periodically. Prereq: COMM 100, ENGL 110 and junior class standing.

ITEC 303: 3 s.h.**Technology Assessment: The Amish and Others (D, P)**

A nontechnical course designed for all students to help learners analyze the use of technology, with focus on Anabaptists (particularly the Amish, Old Order Mennonites and certain Brethren groups) of Lancaster County. Contrasting the way these groups assess and use technology with that of their own culture will allow students to better understand their own approach to technology. Students will develop their own technology-assessment system based on independent research. Offered summer. Prereq: COMM 100, ENGL 110 and junior class standing.

ITEC 304: 3 s.h.**Energy, Sustainability and the Environment (P)**

A nontechnical course for all students dealing with energy sustainability, energy resources and conservation, and the effects of energy use on our environment. This course contains up-to-date information on essential subjects such as solar energy, wind energy, nuclear energy and energy conservation. Contemporary alternatives such as photovoltaic electricity and wind power generation will be addressed. Individual transportation to field sites is required (discuss with instructor before registering for class if this is an issue). Prereq: COMM 100, ENGL 110, MATH 100 or higher and junior class standing.

ITEC 325: 3 s.h.**Power Conversion and Control**

Electric motors as conversion devices is explored. Experiences include designing, creating and testing fluid and electrical energy conversion circuitry to perform specific control applications. 2 hrs. lec., 3 hrs. lab. Offered fall, spring. Prereq: ITEC 120 or 261.

ITEC 326: 3 s.h.**Fluid Power**

Investigation of scientific, mathematical and technological principles. Experiences with the design, creation, use and repair of hydraulic and pneumatic systems. A research and development activity required. 2 hrs. lec., 3 hrs. lab. Offered annually. Prereq: ITEC 120 or 325.

ITEC 327: 3 s.h.**Engineering Structures**

Students will design, construct and evaluate model structures. Emphasis is placed on the use of science, technology, engineering and mathematical (STEM) principles as they relate to structures. 2 hrs. lec., 3 hrs. lab. Prereq: ITEC 120, 130, 241 and MATH 100 or higher.

ITEC 331: 3 s.h.**Construction Technology I**

Utilization of materials for the construction of residential and light commercial structures. Includes the effects of these changes on people and their environment. 2 hrs. lec., 3 hrs. lab. Offered spring. Prereq: ITEC 271 or permission of instructor.

ITEC 332: 3 s.h.**Construction Technology II**

Methods, materials and processes employed in heavy and industrial construction technologies. Includes field engineering techniques, equipment, civil engineering fundamentals, and use of modeling and simulation techniques. Emphasis given to construction projects such as bridges, roads, industrial and commercial buildings, utilities, tunnels and dams. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 271 or permission of instructor.

ITEC 342: 3 s.h.**Computer-Aided Engineering Drawing**

Advanced study of threads, gears and standard fasteners; geometric dimensioning and tolerancing (GD&T); schematic, production and assembly drawings; and introduction to solids modeling. Builds on view orientation, projection systems and basic CAD. 2 hrs. lec., 3 hrs. lab. Offered fall, spring. Prereq: ITEC 241.

ITEC 344: 3 s.h.**Product Design**

Aesthetic and design elements, principles of design, methods of designing, various concepts of the design process and evaluation of designs. A research and development activity required. 2 hrs. lec., 3 hrs. lab. Offered fall, spring. Prereq: ITEC 241.

ITEC 345: 3 s.h.**Statics & Strength of Materials**

Elementary, analytical and practical approaches to the principles and physical concepts of statics. Covers force systems; equivalent force/moment systems; distributed forces; internal forces; principles of equilibrium; application to trusses, frames and beams; stress and strain; and mechanical properties of materials. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 241 and MATH 151, 160 or 161; or permission of instructor.

ITEC 346: 3 s.h.**Architectural Drawing and Design**

Principles of residential design. Emphasizes the development of a complete set of original working drawings; computer-aided design (CAD); presentation drawings and model building; architectural styles and regional differences in materials and construction practices. 2 hrs. lec., 3 hrs. lab. Offered fall, spring. Prereq: ITEC 241.

ITEC 351: 3 s.h.**Digital Imaging**

Create digital images using cameras and scanners. Set up and characterize a digital workstation and produce digitally imaged products. Hands-on activities will require students to demonstrate their proficiency using contemporary hardware and software to compose, capture, convert, color and tonal correct, manipulate and print digital images and products. 2 hrs. lec., 3 hrs. lab. Offered annually.

ITEC 355: 3 s.h.**Contemporary Printing**

Advanced study of today's major printing processes, especially offset and screen. Experiences include layout and design, computerized electronic composition, copy preparation, line and halftone photography, special-effects photography, exposure unit calibration, image assembly, platemaking, printing and finishing complex graphic products. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 251.

ITEC 356: 3 s.h.**Desktop Publishing (W)**

Utilization of desktop microcomputer systems to design, compose and publish graphic materials. A research and development activity required. 2 hrs. lec., 3 hrs. lab. Prereq: ENGL 110.

ITEC 357: 3 s.h.**Packaging and Specialty Printing**

In-depth study of problems and processes related to printing and converting in package, label and specialty printing. Students study and experience package design structures, materials flexographic printing, screen container printing, converting methods and bar code applications. Current industry practices explored. 2 hrs. lec., 3 hrs. lab. Prereq: ITEC 241 and 251; or ART 348.

ITEC 364: 3 s.h.**Digital Electronics**

Practical applications of digital logic for processing electronically encoded information. Covers numbering systems, logic design, basic gates, sequential and combination logic, and digital troubleshooting. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 262 or permission of instructor.

ITEC 375: 3 s.h.**Polymer and Ceramic Technology**

Design, development and production of polymer and ceramic products. Covers contemporary pattern and molding materials along with industrial forming processes. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 271.

ITEC 376: 3 s.h.**Wood Technology**

Use of hand tools and machine woodworking techniques to fabricate wood products. Covers technological problems and contributions of using wood in daily living. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 271.

ITEC 382: 3 s.h.**Computer Numerical Control (CNC) Machining**

Theoretical concepts and industrial applications of CNC technology. Emphasis on programming and integrating computer-aided design (CAD) and computer-aided manufacturing (CAM) technology in the manufacturing of useful products. Student design and programming solutions verified via offline software and through actual part production using CNC machining and turning centers. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 241 and 281 or permission of instructor.

ITEC 392: 3 s.h.**Introduction to Industrial Training (W)**

Techniques and procedures required to conceptualize, prepare, deliver and evaluate training programs. Includes experiences in preparing instructional media, presenting a unit of instruction and developing appropriate evaluation instruments. Offered fall, spring. Prereq: ENGL 110.

ITEC 425: 3 s.h.**Industrial Robotic Systems**

The course provides a study of industrial robotics in modern automated work cells. Topics include the evaluation, justification, programming and integration of industrial robotic devices in order to improve an industrial process. A research and development component required. 2 hrs. lec., 3 hrs. lab. Prereq: ITEC 325.

ITEC 427: 3 s.h.**Programmable Logic Controllers**

Focus on the integration and application of the programmable logic controller (PLC). Students design, construct and troubleshoot a variety of industrial control systems utilizing programmable logic controllers, networks, human-machine interfaces, variable frequency drives, control loops and sensors. A research and development component required. 2 hrs. lec., 3 hrs. lab. Prereq: ITEC 425 and MATH 151 or 161, or permission of instructor.

ITEC 433: 3 s.h.**Construction Project Management**

Methods, processes and information necessary to manage a construction project. Includes cost and risk control; developing and applying policies and procedures; subcontractor management; specifying and purchasing materials; scheduling; and contract development. Experiences include use of project-planning and cost-estimation software for development of a complete project plan. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 332 or permission of instructor.

ITEC 435: 3 s.h.**Manufacturing Enterprise**

Exploration of the technological and management processes for conceptualizing and manufacturing a product. Experiences with product engineering, production engineering, manufacturing management and enterprise operations in a student-centered learning environment. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 110, 120, 130, 140, 241 and 271, and a major in technology education (EDTE).

ITEC 446: 3 s.h.**Computer-Aided Drafting/Design**

Advanced aspects of computer-aided drafting/design (CADD) and information on features and application capabilities of numerous software packages. Includes a series of activities on solids modeling, menu customization, attribute files, advanced dimensioning and editing features. Requires completion of major projects and a research and development activity. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 342 or permission of instructor.

ITEC 448: 3 s.h.**Machine Tool Design**

Analysis, planning, design, construction and application of tools, methods and procedures necessary to increase manufacturing productivity. Integrated with machining and fabrication practices. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 342.

ITEC 455: 3 s.h.**Research and Development in Graphic Communication**

This course involves testing various components of the manufacturing processes involved in creating print and digital/web media. Typical activities will involve testing colorants (e.g., inks, toners, etc.) and substrates used in lithography, flexography, screen printing and digital-printing systems. Optimum conditions for specific printing methods will be determined through controlled testing and examination. Students may also propose to examine specific interrelationships between production procedures used in various digital media processes. The course will also cover color separation and reproduction, which includes the study of process color theory, desktop color separations and color reproduction. 2 hrs. lec., 3 hrs. lab. Prereq: ITEC 355 or permission of instructor.

ITEC 457: 3 s.h.**Print Production Management & Cost Estimating**

A study of current topics and systems for setting printing production standards, cost estimating, production scheduling, job planning and the consideration of new equipment and technologies. Students will integrate the technical knowledge learned through previous graphics laboratory classes with other coursework in management, marketing, science, business, etc., with a focus on how it all relates specifically to the printing production process. The course is structured to offer an overview in several areas of print production management, with emphasis on cost estimating and current printing industry topics. 2 hrs. lec., 3 hrs. lab. Prereq: ITEC 355 and MATH 130, or permission of instructor.

ITEC 466: 3 s.h.**Wireless Communication Systems**

This course utilizes both theory and applications related to wireless communications systems. Topics include amplitude modulation (AM) and frequency modulation (FM) as well as the principles of television broadcasting and reception systems. Transmission lines, antennas and wave propagation are also described. New applications include microwave, wireless telephony, satellite communications and Wireless Fidelity (WiFi™). A research and development activity is required. 2 hrs. lec., 3 hrs. lab. Prereq: ITEC 262 or permission of instructor.

ITEC 467: 3 s.h.**Mobile Robotic Systems**

Study of the development of mobile robotic solutions. Emphasis is placed on the programming and interfacing of microcontrollers to control autonomous mobile robots in known environments. A research and development activity is required. 2 hrs. lec., 3 hrs. lab. Prereq: ITEC 262 or permission of instructor.

ITEC 489: 1 s.h.**Honors Independent Study**

Preparation of honors thesis proposal. For the definition of honors course and student eligibility, refer to the departmental honors section of this catalog. EDTE, AETM and OSEH majors may enroll in the Department of Applied Engineering, Safety & Technology honors program. Contact the department office for guidelines and an application.

ITEC 492: 3 s.h.**Technical Entrepreneurship**

A capstone course in which students study and apply technical, managerial and entrepreneurial concepts to the development and operation of a student-centered venture. Students organize and operate a model enterprise to develop, manufacture and market a consumer product. 2 hrs. lec., 3 hrs. lab. Prereq: ITEC 130 or 241 and BUAD 251 or permission of instructor.

ITEC 494: 3 s.h.**Total Quality Management**

The history and development of quality movements; factors influencing the total quality concept; the scope of modern quality systems; management organization and strategies for quality; engineering technology for quality; and statistical tools for measurement and monitoring of quality. 2 hrs. lec., 3 hrs. lab. Offered fall, spring. Prereq: MATH 130 or permission of instructor.

ITEC 498: 1-3 s.h.**Independent Study in Applied Engineering, Safety & Technology**

See the *Independent Study* section of this catalog. Written permission of faculty sponsor and department chairperson required.

ITEC 499: 1-3 s.h.**Department Honors Thesis**

Completion and defense of thesis research. See the *Departmental Honors* section of this catalog. Contact the Department of Applied Engineering, Safety & Technology office for guidelines.

COURSE DESCRIPTIONS*Nanofabrication Manufacturing Technology***NFMT 311: 3 s.h.****Materials, Safety and Equipment Overview for Nanofabrication**

Focuses on issues encountered in the practice of “top down” and “bottom up” nanofabrication and the safe operation and maintenance of nanofabrication processing equipment and materials-handling procedures. Includes clean-room protocol, safety, and environmental and health issues in the nanofabrication facility at Penn State University. 2 hrs. lec., 2 hrs. lab. Coreq: NFMT 312. Completed at Penn State University in State College during “Capstone Semester.”

NFMT 312: 3 s.h.**Basic Nanofabrication Processes**

Hands-on introduction to the processing sequences involved in “top down,” “bottom up” and hybrid nanofabrication. Details a step-by-step description of processes to fabricate devices and structures. Stresses the importance of environmental control (gas, liquid, vacuum) in processing. 2 hrs. lec., 2 hrs. lab. Prereq: admission to the NFMT “Capstone Semester.” Coreq: NFMT 311. Completed at Penn State University in State College during “Capstone Semester.”

NFMT 313: 3 s.h.**Materials in Nanotechnology**

In-depth, hands-on exposure to depositing and etching a wide variety of materials, including dielectrics, semiconductor organics, polymers, metallic materials and molecular films. Students work in small teams and develop oral and written reports. 2 hrs. lec., 2 hrs. lab. Prereq: NFMT 311 and 312. Completed at Penn State University in State College during "Capstone Semester."

NFMT 314: 3 s.h.**Patterning for Nanotechnology**

Hands-on treatment of all aspects of advanced pattern transfer and pattern-transfer equipment. Includes pattern-generation processes, photolithography, particle beam lithographic techniques, probe pattern generation and three types of lithography (embossing, stamp, self-assembled). 2 hrs. lec., 2 hrs. lab. Prereq: NFMT 311. Completed at Penn State University in State College during "Capstone Semester."

NFMT 315: 3 s.h.**Materials Modification in Nanofabrication**

Detailed coverage of material-processing steps for molecular functionalization, cross-linking, metal silicidation, material oxidation, materials nitration, barrier materials, alloying, annealing and doping. Includes avoiding unintentional materials modification via the use of diffusion barriers, encapsulation, electromigration, corrosion, stress effects and adhesion. 2 hrs. lec., 2 hrs. lab. Prereq: NFMT 311. Completed at Penn State University in State College during "Capstone Semester."

NFMT 316: 3 s.h.**Characterization, Packaging and Testing of Nanofabricated Structures**

Examines a variety of techniques and measurements essential for testing and for controlling final device performance and final packaging. Problems and solutions concerning the interfacing of the macro-world with micro- and nano-scale devices will be analyzed and examined. 2 hrs. lec., 2 hrs. lab. Prereq: NFMT 311. Completed at Penn State University in State College during "Capstone Semester."

COURSE DESCRIPTIONS*Occupational Safety and Environmental Health***OSEH 120: 3 s.h.****Fundamentals of Safety, Health and Environmental Issues (G3)**

Introduction to safety, health and environmental issues that impact people and workplaces. Includes the historical development of safety, the impact of accidents on society, a legislative overview, and basic principles of personal risk assessment and management.

OSEH 220: 3 s.h.**Legal Aspects of Safety and Hygiene**

Legal issues relative to occupational safety and environmental health. Includes federal and state legislation, resolution of legal and ethical challenges, product safety and professional liability. Offered annually.

OSEH 221: 3 s.h.**Industrial Fire Prevention, Protection and Control**

Basic principles, chemistry of fire, fire hazards determination, workforce notification, alarm and sprinkler systems, protective equipment, evacuation procedures and firefighting methods. Offered fall, spring.

OSEH 320: 3 s.h.**Safety Engineering Principles**

Methods for the identification and analysis of industrial hazards. Emphasis on application of basic safety engineering principles for the control of losses in an industrial environment. Offered fall, spring. Prereq: OSEH 120.

OSEH 321: 4 s.h.**Environmental and Industrial Hygiene I**

Fundamental theory and methods used in identifying, evaluating and controlling the health risks of chemical contaminants and biological agents. Includes coverage of toxicology, exposure standards, medical surveillance, toxic air emissions, air-sampling techniques, air pollution control and protective equipment. Offered fall. Prereq: MATH 101 or equivalent, OSEH 120, CHEM 104.

OSEH 323: 3 s.h.**Human Factors in OSEH**

Ergonomic study of interaction between people and their work. Emphasis on the application of biological sciences to engineering principles in an effort to optimize efficiency, productivity and safety. Topics include anthropometrics, biomechanics, design principles, physiological and cognitive capabilities, and task-evaluation techniques. Offered spring. Prereq: OSEH 120 or permission of instructor.

OSEH 333: 3 s.h.**Introduction to System Safety**

Qualitative and quantitative system safety methods used to analyze and control risk. Includes a variety of analytical engineering techniques that are applied to practical system-analysis problems. Offered fall. Prereq: OSEH 320 and MATH 130.

OSEH 410: 3 s.h.**Safety and Environmental Health Program Management**

Principles and practices of occupational safety and environmental health management. Includes the development of safety objectives and policy, evaluation and management of risk, and program implementation and evaluation. Offered annually. Prereq: OSEH 220 and 320, or permission of instructor.

OSEH 422: 4 s.h.**Environmental and Industrial Hygiene II**

Fundamental theory and methods used in the evaluation and control of the physical agents of noise, ionizing and nonionizing radiation, and thermal stress. Covers regulatory standards, control technology, industrial and general ventilation, and compliance methods related to indoor air quality, water quality, industrial waste and environmental management programs. Offered spring. Prereq: MATH 101 or 151 or 160 or 161 and PHYS 103 or 104 or 131, or permission of instructor.

OSEH 430: 3 s.h.**Topics in Occupational Safety and Environmental Health**

Investigation of one or more topics that vary according to needs and interests of students and staff. Offered periodically. Prereq: senior OSEH majors and practitioners, or permission of instructor.

OSEH 435: 3 s.h.**Environmental Technology**

Review of scientific and technical foundations, with an examination of problems, regulations and control strategies. Covers identification of pollution sources, evaluation strategies, engineering controls, government regulations, basic dispersion modeling, and human and nonhuman effects. Emphasis is on practical information needed by environmental-health professionals to resolve issues affecting industry. Offered annually. Prereq: OSEH 321 or ENVI 330 or permission of instructor.

OSEH 440: 6 s.h.**Internship in Occupational Safety and Environmental Health**

Students work full-time for nine weeks or more under the direct supervision of an OSEH professional in industry, insurance, government agency or other approved location. University supervision, seminars and evaluation are provided. Students experience problems, practices and principles in the management of occupational safety and/or industrial hygiene programs. To be taken twice, concurrently or consecutively, with increased work and research responsibilities. Prereq: senior OSEH majors and permission of OSEH coordinator.

*Technology & Engineering Education***EDTE 290: 3 s.h.****Children's Engineering**

The intent of this course is to teach students about fundamentals of electricity, mechanisms, fluidics (liquids and gases under pressure), computer-control, and structures. Content will be delivered through a series of hands-on activities that will allow the students to immerse themselves in the content through problem-based learning by doing. Simple knowledge- and skill- building activities will lead to more complex open-ended problem-solving and prototyping activities to build deeper understandings of scientific, technological, engineering and mathematical (STEM) concepts for teachers of young children. Prereq: ERCH 190. For Integrative STEM Education Methods minors only.

EDTE 291: 3 s.h.**Foundations of Technology Education**

An introduction to the social, historical and philosophical foundations of technology education leading to contemporary programs. Provision is made for observation of classroom and laboratory practices in selected schools. Offered fall, spring. Prereq: sophomore standing. Must achieve a "C" or higher for admission to advanced professional studies (APS).

EDTE 391: 3 s.h.**Curriculum and Instruction in Technology Education (W)**

Professional teacher preparation in curriculum design and instructional planning and delivery. Major topics involve developing a philosophical basis for contemporary curriculum writing, content selection, instructional objective design, lesson planning and the use of instructional technology and computers in conjunction with several technology education teaching strategies. Field experiences provided within technology education classes in local schools. Offered fall, spring. Prereq: C or higher in EDTE 291, EDFN 211, 241 and ENGL 110. Admission to advanced professional studies (APS) required. Must achieve a "C" or higher to progress to student teaching.

EDTE 490: 3 s.h.**Integrative Learning Using Experiential Strategies**

The purpose of this course is to engage students in curriculum planning, design and assessment that will enable them to identify, use and evaluate experiential and integrative teaching-learning strategies that facilitate connections between all subjects in grades preK to grade 6 (e.g., literacy, science, mathematics, social studies, arts, technology, physical education, engineering). Prereq: ERCH 190, EDTE/ERCH 290, and ITEC 344. For Integrative STEM Education Methods minors only.

EDTE 461: 12 s.h.**Student Teaching**

Student teachers are assigned full-time to selected cooperating teachers in the Lancaster area. They are supervised by University faculty and gain experience in the responsibilities of the teacher. Offered fall, spring. Prereq: EDTE 391 with a "C" or higher. (See *Student Teaching* in this catalog.)

EDTE 491: 1 s.h.**Seminar in Technology Education**

Professional education issues and effective teaching and learning during student teaching. Emphasis on planning, teaching, managing and assessing technology education units of instruction. Attention given to legal issues, safety, professional development and meeting the needs of all students in the technology education environment. Prereq: C or higher in EDTE 391. Coreq: EDTE 461: Student Teaching.

EDTE 495: 3 s.h.**Integrative STEM Education Practicum**

This clinical practicum course provides opportunities for teacher candidates to bridge theory and practice. Students will demonstrate and apply knowledge, skills and dispositions related to the implementation of integrative science, technology, engineering and math (STEM) education at the preK to grade 4 level. Emphasis is placed on the planning, development, implementation and assessment of integrative STEM instructional activities and lessons that use problem-based and experiential learning techniques targeted for preK to grade 4 students. Includes field experiences. Prereq: ERCH 190, EDTE/ERCH 290, ITEC 344, and EDTE 490/690 or permission from instructor; Advanced Professional Studies (APS) status required. For Integrative STEM Education Methods minors only.

EDTE 496: 2 s.h.**Innovation and Design Methodologies**

Technology education methodologies for instruction in advanced design and innovation. Teams of students develop solutions to technological problems. 1 hr. lec., 3 hrs. lab. Offered fall, spring. Prereq: ITEC 110, 120, 130, 140, 344; MATH 130 or higher; and ENGL 312 or 316.

GRADUATE-LEVEL COURSES

NOTE: Undergraduate students may elect 500-level courses in lieu of 300- or 400-level elective courses with permission of the student's academic advisor, department chairperson and the instructor involved. See the *Graduate Catalog* for course descriptions.

EDTE 592: 3 s.h.

Teaching Technology in the Elementary School

ITEC 515, 525, 535: 3 s.h.

Advanced Problems in Communication, Transportation/Energy/Power or Production Technology

ITEC 586-9: 1-3 s.h.

Topics in Applied Engineering, Safety & Technology

ARMY: MILITARY SCIENCE (ROTC)

Reserve Officers' Training Corps

Professor Wyszynski; Instructors Podoji, Powley

The Reserve Officers' Training Corps program is open to all students, with an objective to produce leaders capable of serving as commissioned officers in the U.S. Army active and reserve forces. It provides basic military education which, in conjunction with other college disciplines, develops the attributes essential for successful executive performance. The ROTC program is divided into two parts: the Basic Course and the Advanced Course. The basic course (100- and 200-level military science courses) is primarily for freshman and sophomore students. Students do not incur military obligation. The advanced course (300- and 400-level military science courses) is reserved for junior, senior and graduate students. Students who successfully complete all of the training may be commissioned as a Second Lieutenant in the United States Army, the United States Army Reserve or the National Guard upon graduation from the University. A commissioned officer will serve in various positions, leading the dedicated soldiers who defend our nation. Advanced course enrollment requires approval of the Professor of Military Science. Upon contracting, students receive a monthly stipend of \$300 to \$500 and may compete for additional scholarship benefits. Specialized military schools, internships and overseas cultural/language training programs are available on a competitive basis to contracted cadets.

COURSE DESCRIPTIONS

MILS 101, 102: 1 s.h.

Introduction to Military Science

An introduction to the fundamental components of service as an officer in the United States Army. Initial lessons form the building blocks of progressive lessons in values, fitness, leadership and officership. By means of both written and oral presentations regarding the history of military art, battle history, technical studies and the relationship of the armed forces with society, students will be encouraged to develop a habit of critical reflection. In addition to developing a foundation of military officership and leadership, students will receive practical instruction in the application of military art and basic soldier skills. Meets one hour per week plus a weekly 90-minute leadership lab. MILS 101 in fall and MILS 102 in spring.

MILS 210, 211: 2 s.h.

Self and Team Development & Military Leadership

A continuation of the fundamentals introduced the previous year by focusing on leadership theory and decision making. "Life skills" lessons during this year include problem solving, critical thinking, leadership theory, followership, group interaction, goal setting and feedback mechanisms. The use of practical exercise is significantly increased over previous semesters, as cadets are increasingly required to apply communication and leadership concepts. Meets two hours per week plus a weekly 90-minute leadership lab. MILS 210 in fall and MILS 211 in spring.

MILS 301, 302: 3 s.h.

Leadership and Management & Military Tactics

Advanced instruction in topics introduced during the basic course. Emphasis on leadership. Situations require direct interaction with other cadets and test the student's ability to achieve set goals and to get others to do the same. Students master basic tactical skills of the small unit leader. Principles and techniques of effective leadership, methods of developing and improving managerial abilities and leadership qualities, and a basic understanding of interpersonal interactions. Use is made of recent developments in the administrative and behavioral sciences to analyze the individual, group and situational aspects of leadership and the management of resources. Participation in operations and basic tactics to demonstrate leadership problem solving and to develop leadership skills. Meets two hours per week plus a weekly 90-minute leadership lab. Prereq: open only to advanced-course cadets. MILS 301 in fall and MILS 302 in spring.

MILS 401, 402: 3 s.h.

Contemporary Military Issues

Emphasis is placed on developing planning and decision-making capabilities in the areas of military operations, logistics and administration. Concepts of organization theory and the principles of management, and management and leadership relationships are investigated as they apply to the general theory and practice of the management functions of planning, organizing, staffing, direction, coordination, control, innovation and representation. Meets two hours per week plus a weekly 90-minute leadership lab. Prereq: open only to advanced course cadets. MILS 401 in fall and MILS 402 in spring.

ART & DESIGN

College of Arts, Humanities and Social Sciences

Professor Sigel, chairperson

Professors Andriulli, Frischkorn, Robinson, Schuller
Associate Professors Bruntse, Cunningham, Mata, Pannafino
Assistant Professors Filippone, Gates, McDonah

The Department of Art & Design is an accredited institutional member of the National Association of Schools of Art and Design and offers three baccalaureate degree programs: the Bachelor of Arts in art (B.A.), the Bachelor of Science in art education (B.S.Ed.), and the Bachelor of Fine Arts in art (B.F.A.). The recommended course sequence during the first two years for all three programs is similar so that any change in degree program within the art department need not result in loss of time or credits.

Liberal arts, art education and fine arts degree programs are designed to offer the flexibility needed to meet the unique needs of each student. To lend authenticity to this idea, each student, with the help of an advisor, assumes much of the responsibility for determining their program of study.

B.A. and B.F.A. art students must maintain a minimum grade point average of 2.0 in their major, while B.S.Ed. students must maintain a minimum GPA of 3.0 overall.

The B.A. program in art provides a sound, broad-based educational foundation which, to a considerable extent, can be individually tailored to meet the specific educational goals of each student.

The B.S.Ed. in art education program is designed for students who aspire to become art teachers. Upon completing this program, students are certified to teach art at both the elementary and secondary levels in the public and private schools of Pennsylvania.

The B.F.A. program offers greater depth in art studio and is the professional studies program designed for persons who either intend to become self-employed artists, or graphic designers who wish to further their education in graduate school programs in studio art. Additionally, students may combine the B.F.A. degree with teaching certification.

The art & design department encourages highly motivated students to participate in internship and cooperative education opportunities that exist in both the public and private sectors. These opportunities are described in the *Special Academic Opportunities* section.

Applicants for the art B.F.A., art B.A. or the art education B.S.Ed. programs, including transfer applicants, must submit an art portfolio. Accepted students will receive a letter with specific details regarding electronic portfolio submission. No original work will be accepted. The portfolio should include a variety of the student's best work. Ten to 15 pieces will be requested in total, with at least two of the drawings from direct observation. There will be no in-person reviews. Portfolio review deadlines are the first day of the month from September to May.

COURSE REQUIREMENTS

Art Major (B.A.): 120 s.h.

Core Studies: Students must complete the design-drawing foundation program (ART 142, 242 and 133) and select* any two courses in art history. Students must select* one course from at least three of the following five areas: painting, graphics, printmaking, 3D art and visual communication.

Areas of Extension: To complete their program, students must select* any additional eight courses offered by the art department.

Specialization

Students interested in graphic and interactive design may choose to pursue a B.A. or B.F.A., with a specialization in graphic design. The following is a suggested course sequence for the B.A. In addition to the design-drawing foundation program (ART 142, 242 and 133) and any two courses in art history, students must select one course from at least three of the following five areas: painting, photography, printmaking, graphics and 3D art. They must select* one to three courses offered by the art department to complete a total of 48 s.h. in their program. Beyond the B.A. requirements, students should complete ART 344 and select at least 15 s.h. (five courses) from the following list in consultation with their advisors: ART 240, 244, 306, 345, 346, 375, 441, 444, 445, 446 and 447. Students interested in graphic design and choosing to pursue the B.F.A. would structure their studio concentration around graphic design.

Art Education Major (B.S.Ed.): 126 s.h.

Certification in Art Education

Core Studies: Students must complete the design-drawing foundation program (ART 142, 242, 133, 233) and ART 202 and ART 203, plus two art history courses. Students must take the following required core courses (15 credits): Ceramics: Handbuilding or Wheel Throwing; Painting I; Survey Printmaking; Fine Art Metals I or Sculpture I, Photography or Typography I.

In addition, students must take an additional 12 credits of studio art and complete the art education foundation program (ART 221, 324 and 325); 60 total credits must be completed from the art department. Prereq: EDSE 340, SPED 346, EDSE 471.

The following courses are also required: EDFN 211, 241; EDAR 461, 462; PSYC 100, 227; two math classes; one ENGL literature and a second ENGL class.

Fine Arts Major (B.F.A.): 126 s.h.

Foundation Courses: Students must complete the B.F.A. design-drawing foundation program: ART 142, 242, 133, 233 and 333, plus ART 202 and 203 and any two art history courses. Students will choose one course from at least five of the following seven areas: ceramics, fine art metals, painting/watercolor/drawing, photography, printmaking, sculpture and graphic design/computer art.

Concentration: Students must complete a minimum of 15 s.h. in at least one of the following studio areas: ceramics, fine arts metals, painting/watercolor/drawing, photography, printmaking, sculpture, and graphic and interactive design. The concentration may include work taken to satisfy the required art courses. Students must select* art electives to bring their total art major credits to 75 s.h. During the semester in which a student anticipates completing 60-75 s.h., a second portfolio review and evaluation must be approved by the art department portfolio review committee for continuance in the B.F.A. program. Along with completion of ART 490, a senior exhibition, professional portfolio and slides of the student's artwork are graduation requirements.

Studio Art Minor

The studio art minor is a program of study designed for the student who wishes to pursue a sequence of courses in studio art in addition to those

of his/her major field. Students must complete ART 133 and ART 142 or 242; select one art history course; and select three additional art electives to complete the 18 s.h. program.**

Photography Minor

The photography minor is a program of study designed for the student who wishes to pursue a sequence of courses in photography in addition to those of his/her major field. Students must complete ART 133 or 142, ART 201 and select four additional photography elective courses.

Art History Minor

The art history minor is a program of study designed for the student who wishes to pursue a sequence of courses in art history in addition to those of his/her major field. Students must complete 18 credits in art history.

*With the approval of the student's advisor.

**A minimum of two 300-level courses must be completed to satisfy program requirements.

COURSE DESCRIPTIONS

Art History and Criticism

ART 100: 3 s.h.

Art in Culture (G1)

A general study of the role of historical and contemporary art in society. Critical analysis of art that addresses the following: What is art? Why is it made? How is it made? What is the context in which it was created? An understanding of the importance of art and of the creative process. Does not count towards any art major. Offered fall, spring, periodically and summer.

ART 201: 3 s.h.

History and Aesthetics of Photography (G1)

A survey of the history, principles and theory of photography in the 19th and 20th centuries as it is used as an aesthetic medium and for visual communication. Differentiation between photographs made as art vs. snapshots, photojournalism, scientific record and commercial art is emphasized. Offered periodically.

ART 202: 3 s.h.

Survey of Art History I (G1)

Introduction to art and to the discipline of art history, beginning with Prehistory through the early Italian Renaissance. The course focuses on the functions and meanings of individual works of art, visual culture and art history as a discipline. Designed as an introduction to art history for both non-art and art majors. Offered fall.

ART 203: 3 s.h.

Survey of Art History II (G1)

Introduction to art and to the discipline of art history, beginning with the early Italian Renaissance period through the 20th century. Focuses on the functions and meanings of individual works of art, visual culture and art history as a discipline. It is designed as an introduction to art history for both non-art and art majors. Offered fall.

ART 301: 3 s.h.

The Ancient World (G1)

A survey of Western painting and sculpture from the Paleolithic through the Hellenistic periods. Prereq: ART 202 or by permission of instructor. Offered periodically.

ART 302: 3 s.h.

The Italian Renaissance (G1)

A comprehensive analysis of painting and sculpture produced in Florence and Siena from the 13th through the 15th centuries. Prereq: ART 202 or by permission of instructor. Offered periodically.

ART 303: 3 s.h.

The 19th Century (G1)

A survey of European art of the 19th century. Offered periodically. Prereq: ART 203 or by permission of instructor.

ART 304: 3 s.h.

The 20th Century (G1, W)

The varied schools and styles of painting and sculpture in the 20th century. Offered annually. Prereq: ENGL 110 and ART 203 or by permission of instructor.

DESN 307: 3 s.h.

Visual Communication Design History

History of visual elements and technological processes involved in an informed view of design from the beginning of pictographic language to the present. Covers four main areas of investigation: an analysis of the evolution of formal or visual attributes; the relationship between design and its audience; the study of the social and economic activity of design as it is circulated in communities and across continents; and the effect of technology on the aesthetics of design. Offered periodically.

ART 313: 3 s.h.

Art in America (G1)

A comprehensive survey of 18th- and 19th-century American painting, concentrating on those influences and traditions that were significant in the development of the art of the New World. Offered periodically. Prereq: ART 203 or by permission of instructor.

ART 403: 3 s.h.

Art History: The Northern Renaissance

An in-depth study of Flemish, Dutch, Bohemian and German painting from the 14th through 16th centuries. Offered periodically. Prereq: ART 203 or by permission of instructor.

ART 404: 3 s.h.**Contemporary Movements in Art (G1, W)**

An in-depth study of the contemporary art scene, including an exploration of its cultural and historical roots. Offered annually. Prereq: ENGL 110 and ART 203 or by permission of instructor.

ART 588, 589: 3-6 s.h.**Topics in Art History**

Offered periodically.

*Art Education***ART 141: 3 s.h.****Fundamentals of Studio Art (G1)**

Art experiences with various media and techniques, criticism, and analysis of historical art. Does not count towards any art major. Offered fall, spring and periodically in summer and winter.

ART 221: 3 s.h.**Introduction to Art Education**

An overview of art education, with particular emphasis on historical and contemporary rationales for teaching art, the identification of authentic assessment practices, and the observation of art instruction and alternative career options through a variety of field experiences. Offered fall. Art majors only.

ART 322: 3 s.h.**Child Development in the Visual Arts (W)**

An investigation and application of child development theories in the visual arts, the introduction of PDESAS-based curriculum writing and the exploration of, and assistance in, art introduction through a variety of service learning-based field experiences. Offered fall. Prereq: admission to Advanced Professional Studies, ENGL 110, ART 221, EDFN 211, 241.

ART 324: 3 s.h.**Meaningful Art Education (W)**

Build on the rationales for art education addresses in ART 221 with an investigation into designing meaningful art education experiences for PreK-12 students. Design art education experiences and consider how policies at the state and local levels influence how teachers enact curriculum in their classrooms. Offered annually. Prereq: Act 34/151 and FBI clearances and TB test results, ENGL 110, ART 221, EDFN 211, 241.

ART 325: 3 s.h.**Methodology and Pedagogy of Art (W)**

An examination of classroom strategies, materials and technologies used in teaching art to develop creative and critical thinking in all students. An emphasis on self-reflection and professionalism through team teaching and service learning in a variety of field experiences. Offered fall. Prereq: admission to Advanced Professional Studies, ENGL 110, ART 322.

ART 327: 3 s.h.**Art for the Exceptional Child**

An exploration of instructional theories, methods and materials for exceptional children. Offered infrequently.

EDAR 461 and EDAR 462: 9 s.h.**Student Teaching and Seminar**

Elementary and secondary student-teaching placements in art education. Offered fall and spring. EDSE 471 must be taken with student teaching. Prereq: APS standing.

ART 521: 3 s.h.**Visual Resources in Art Education****ART 522: 3 s.h.****Art Media Studio/Seminar****ART 523: 3 s.h.****Art Curriculum Seminar/Workshop****ART 586, 587: 3-6 s.h.****Topics in Art Education***Drawing***ART 133: 3 s.h.****Drawing I (G1)**

Introduces drawing as artistic expression as well as a form of nonverbal communication. Traditional and contemporary perspectives. Emphasis on original, creative solutions to visual problems. Students explore artistic composition employing various drawing media and techniques. Includes criticism, analysis and evaluation. For both the non-art major and the art major. Offered fall, spring and periodically in summer.

ART 233: 3 s.h.**Drawing II**

Fundamental drawing skills are stressed, and personal expression is emphasized. A variety of techniques and observational exercises will be used. Working from the figure, short and extended studies will be developed. Offered spring and periodically in summer. Prereq: ART 133.

ART 333: 3 s.h.**Drawing III**

Continued drawing skill development using a variety of subjects, including the figure. Traditional and nontraditional approaches to methods and materials are encouraged. Individual development of a personal idiom of expression will be required. Prereq: ART 233. Offered spring.

ART 433: 3 s.h.**Drawing IV**

Advanced drawing in which individual style and technique are emphasized. An intensive course of independent research, including creation of a portfolio. Prereq: ART 333. Offered spring.

ART 533, 534: 3-6 s.h.**Drawing**

Offered spring.

*Foundation Design***ART 142: 3 s.h.****2D Design (G1)**

Introduces two-dimensional design and composition, applicable to all art forms, in which students seek original, creative solutions to problems. Design principles and methods are employed as students learn language and visual communication techniques. Artistic production, criticism, analysis and evaluation are central to this course. For both non-art and art majors. Offered fall, spring.

ART 242: 3 s.h.**3D Design**

Introduces visual composition as related to organizing and working with three-dimensional space. The student seeks original, creative solutions to visual problems by exploring methods and techniques. Covers fundamental visual grammar and principles. Offered fall, spring. Prereq: ART 142.

*Graphic & Interactive Design***ART 140: 3 s.h.****Digital Foundations of Art (G1)**

Introductory studio course that allows for investigation of contemporary digital-media methods used by artists and designers. Image making will utilize raster, vector and interactive techniques. Primary course emphasis is on creative problem solving followed by technical skill building while using the computer as a tool. Offered periodically.

DESN 144: 3 s.h.**Digital Theory and Skills**

An introduction to the basic vocabulary and principles of visual communication and media theory, including the various roles and digital tools, skills and techniques of the graphic and interactive design industry. Offered fall, spring.

DESN 240: 3 s.h.**Typography**

History and development of communication systems. Traces history of Western culture through study and studio practice. Includes creative design project in layout and composition. Includes criticism, analysis and evaluation. (For both art and non-art majors.) Offered fall, spring.

DESN 244: 3 s.h.**Typography II**

Studio course explores the origins of alphabets and writing, and the development, classification and creative use of typefaces in graphic design. Includes hand lettering, basic typography specification and copyfitting, type indication, type personification, computers in typography and use of type as image and design. Emphasis on creative problem solving through typography. Offered annually. Prereq: DESN 240, 142 or permission of instructor.

DESN 246: 3 s.h.**Intro to Sequence, Motion and Visual Communication**

A study of narrative structures and spatial compositions as they relate to time and sequence. Students will be introduced to the principles of time-based design, with an emphasis on research, critical analysis and concept development. Various production methods such as storyboarding and scoring will be introduced. Offered periodically. Prereq: DESN 144 or permission of instructor.

DESN 247: 3 s.h.**Introduction to Web Experience and Interaction Design**

Focuses on the fundamentals of user-centered design and usability issues surrounding web-based interfaces (Internet, PDA, cell, etc.). Examines information architecture models, content/design relationships, user behaviors and user testing scenarios. The goal is ultimately to develop awareness of the pitfalls of poor design and usability while honing good design habits. Offered periodically. Prereq: DESN 144 or permission of instructor.

DESN 340: 3 s.h.**Interaction Design**

Further exploration of the principles and methodologies associated with digital media and interaction design, including complex multimedia presentations and applications for the Worldwide Web. Students will study human-factor variables of design utilizing time-based and interactive design processes, and explore design as a social, cultural and political activity. Methods for analysis and production will continue to be emphasized. Offered periodically. Prereq: DESN 247 or permission of instructor.

DESN 341: 3 s.h.**Motion Design**

Explore time-based visual communication environments. Unique conditions influencing the roles of typography, image, symbolic systems, narrative, and sound and time systems are assessed in the resolution of assigned projects. Students are exposed to the tools, theories, aesthetics and techniques used in time-based message building. Offered periodically. Prereq: DESN 246 or permission of instructor.

DESN 342: 3 s.h.**Kinetic Design**

An introduction to broadcast design, film graphics and the principles of motion graphics design. The animation process, theories of montage, timing principles, principles of composition, using color effectively, compositing, integrating type, and integrating still and moving imagery will be covered. Offered periodically. Prereq: DESN 246 or permission of instructor.

DESN 343: 3 s.h.**Experience Design (W)**

Synthesis and analysis of relevant aspects of meaningful human interactions in a networked and mediated environment, including physical, cognitive/emotional, social, political, economic and cultural dimensions of these interactions, and the relationships of such interactions to commerce, learning, work, play, community and gaining access to the privileges of user experience. In an exploration of language structures (storytelling) that enhance understanding and support users' objectives in a variety of contexts, students will explore the construction of verbal messages and the roles they play in defining experience. Offered periodically. Prereq: ENGL 110, DESN 247 or permission of instructor.

DESN 344: 3 s.h.**Visual Communications and Graphic Design I**

An exploration of contemporary design practice and theory. Offered fall and/or spring. Prereq: ART 133 or 142 or permission of instructor.

DESN 345: 3 s.h.**Introduction to Computer Art**

Explores and develops design capabilities to aesthetic expression through the use of contemporary digital media. Offered periodically. Prereq: ART 133 or 142.

ART 346: 3 s.h.**Introduction to Computers in Design**

Explores and develops design capabilities for graphic expression through the use of contemporary digital media. Offered periodically. Prereq: ART 133 or 142.

DESN 347: 3 s.h.**Design for Social Equity (D)**

Exposes students to a wide range of materials that cause them to take a more analytical and critical approach to the field of graphic and interactive design, and gain a better understanding of the cultural impact they can have as designers. This will be applied to the creation of written practical design projects. Offered periodically. Prereq: DESN 144 or 240 or permission of instructor.

DESN 348: 3 s.h.**Packaging and Design**

Development of three-dimensional design solutions related to the presentation of object and product, linked with conceptual idea-driven work. The analysis of two-dimensional graphic applications of three-dimensional form is stressed. Offered periodically. Prereq: DESN 144 or 240 or permission of instructor.

DESN 349: 3 s.h.**Information Design**

Introduction to the principles of information design: wayfinding design and environmental graphics. These principles are applied to the design of environmental signage and other graphic communication used in both public and private environments. Issues of function, legibility and fabrication will also be introduced. Offered periodically. Prereq: ENGL 110 and DESN 144 or 240 or permission of instructor.

DESN 375: 3 s.h.**Illustration**

Studio exploration of various techniques and digital media appropriate for contemporary illustration. Offered periodically. Prereq: ART 133 or 142.

DESN 444: 3 s.h.**Visual Communications and Graphic Design II (W)**

Continued study of visual communications, with an emphasis on print and digital publication design. Offered fall and/or spring. Prereq: ENGL 110 and DESN 144 or permission of instructor.

ART 445: 3 s.h.**Advanced Computer Art**

Offered periodically. Prereq: ART 345.

DESN 446: 3 s.h.**Advanced Computers in Design**

Offered fall and/or spring. Prereq: ART 346.

DESN 447: 3 s.h.**Advanced Web Design II**

Offered annually. Prereq: DESN 247.

DESN 493: 3 s.h.**Portfolio**

Capstone class for B.A. or B.F.A. student, with a concentration in graphic and interactive design. The course is designed to prepare the student for entry into the graphic design field or graduate school. The student will create a professional-quality portfolio of work for entry into the graphic design field or graduate school. Offered periodically. Prereq: DESN 246, 247, 344, 347 or permission of instructor.

*Painting & Watercolor***ART 352: 3 s.h.****Painting I**

An introduction to painting in oil, acrylic and related media in which the student explores basic techniques and approaches to painting through the use of drawing, design and color. Offered fall, spring. Prereq: ART 133, 142 or permission of instructor.

ART 354: 3 s.h.**Painting II**

Continued development of painting skill, with emphasis on sustained individual development and technical expression. Offered fall, spring. Prereq: ART 352 or permission of instructor.

ART 452: 3 s.h.**Painting III**

Further study in painting as the individual student works toward developing a personal idiom of expression. Offered fall, spring. Prereq: ART 354 or permission of instructor.

ART 454: 3 s.h.**Painting IV**

An advanced course in which students continue to develop style and technique as they seek their own direction in painting. Offered fall, spring. Prereq: ART 452 or permission of instructor.

ART 552, 554: 3-6 s.h.**Painting****ART 353: 3 s.h.****Watercolor I**

Introduces watercolor techniques through a series of problems related to the development of skill in handling the medium. Offered annually. Prereq: ART 133 and ART 142 or permission of instructor.

ART 355: 3 s.h.**Watercolor II**

Continued development of painting in watercolor, with emphasis on sustained individual development and technical expression. Offered annually. Prereq: ART 353 or permission of instructor.

ART 453: 3 s.h.**Watercolor III**

Further study in watercolor as the individual student works toward developing a personal idiom of expression. Offered annually. Prereq: ART 355 or permission of instructor.

ART 455: 3 s.h.**Watercolor IV**

An advanced course in which students continue to develop style and technique as they seek their own direction in watercolor painting. Offered annually. Prereq: ART 453 or permission of instructor.

ART 553, 555: 3-6 s.h.**Watercolor and Related Media***Photography***ART 167: 3 s.h.****Experimental Photography (G1)**

Nontraditional, historical and hybrid photographic processes are explored, including pinhole cameras, photograms and antique processes. Covers criticism, history, analysis and mounting prints for display. Students do not need a camera. Offered fall.

ART 306: 3 s.h.**Introduction to Photography: Darkroom (G1)**

Beginning black-and-white darkroom course with an emphasis on fine art, including operation of camera, developing film, making enlargements and mounting prints for display. Covers criticism, history and analysis. Students must have a 35mm single-lens reflex film camera with fully manual focusing/exposure capabilities. Offered fall, spring.

ART 376: 3 s.h.**Intro to Photo: Digital (G1)**

Beginning digital course that introduces the basic skills and concepts associated with digital photography as used by contemporary visual artists and communicators. Covers cameras, computer hardware, photo-editing software, printing, file management, criticism, history and analysis. Students must have a digital single-lens reflex camera. Offered annually.

ART 406: 3 s.h.**Intermediate Photography: Darkroom**

Intermediate photography course with an emphasis on fine art, self-expression and creating a body of work, including color techniques, black-and-white techniques, studio-lighting techniques, making enlargements and presenting prints for display. Covers criticism, history and analysis. Students must have a 35mm single-lens reflex film camera with fully manual focusing/exposure capabilities. Offered fall, spring. Prereq: ART 306 or permission of instructor.

ART 409: 3 s.h.**Advanced Photography**

Advanced photography course with an emphasis on fine art, self-expression and creating a long-term body of work, including color techniques, black-and-white techniques, studio-lighting techniques, digital techniques, making enlargements and presenting prints for display. Covers criticism, history and analysis. Students must have a 35mm single-lens reflex film or digital camera. Offered fall, spring. Prereq: ART 406 or permission of instructor.

ART 410: 3 s.h.**Intermediate Photography: Digital**

Digital course with a focus on fine art, including operation of camera, using Adobe Photoshop software, editing images, outputting images, making prints and matting prints for display. Covers criticism, history and analysis. Students should have a digital single-lens reflex camera. Loan cameras are also available. Offered spring. Prereq: ART 142, 376.

ART 567: 3 s.h.**Advanced Photography II**

Advanced photography course with an emphasis on fine art, self-expression and creating a professional portfolio of work, including color techniques, black-and-white techniques, studio-lighting techniques, digital techniques, making enlargements and presenting prints for display. Covers criticism, history and analysis. Students must have a 35mm single-lens reflex film or digital camera. Offered fall, spring. Permission of instructor.

*Printmaking***ART 361: 3 s.h.****Survey Printmaking**

Introduction to the four areas of printmaking: relief, intaglio, lithography and silkscreen. Projects in each of these areas will develop technical skills and understanding of the physical nature of creating original prints. Issues of subject matter, content and intent will be discussed and explored. Creative and original solutions to visual problems will be emphasized. Offered fall. Prereq: ART 133, 142.

ART 363: 3 s.h.**Lithography Printmaking I**

Explores multiple approaches to creating lithographic prints. Starts at an introductory level technically and builds with each new process into an intermediate understanding and working knowledge of the process. Covers stone lithography, aluminum plate lithography and waterless lithography. Offered periodically. Prereq: ART 133, 142.

ART 364: 3 s.h.**Relief Printmaking I**

Explores multiple approaches to creating relief prints. Starts at an introductory level technically and builds into an intermediate understanding and working knowledge of the process. Covers linocut, alternative relief matrices, color reduction and multiple block relief printing. Offered periodically. Prereq: ART 133, 142.

ART 365: 3 s.h.**Intaglio Printmaking I**

Explores multiple approaches to creating intaglio prints. Starts at an introductory level technically and builds into an intermediate understanding and working knowledge of the process. The course will cover drypoint etching (hardground/softground), aquatint and sugar lift, white ground, toner transfers, spitbite, and will introduce color printing (à la poupée/monoprinting). Offered periodically. Prereq: ART 133, 142.

ART 367: 3 s.h.**Water-based Silkscreen Printmaking I**

Explores multiple approaches to creating water-based silkscreen prints. Starts at an introductory level technically and builds into an intermediate understanding and working knowledge of the process. Covers basic to intermediate stencil preparation, including photographic processes. Offered periodically. Prereq: ART 133, 142.

ART 368: 3 s.h.**Collage**

Offers a historical look at the last 100 years of collage as a media for fine art. Highlights of its history will be discussed and followed by a hands-on application of the ideas and imagery that it encompasses. Offered infrequently. Prereq: ART 133, 142.

ART 463: 3 s.h.**Lithography Printmaking II**

Explores multiple approaches to creating color lithography prints. A continuation of Lithography Printmaking I, this course technically builds with each new process into an advanced understanding and working knowledge of the process. Uses stone lithography, plate lithography and waterless lithography to explore printed color and individual investigations into artmaking. Offered periodically. Prereq: ART 363.

ART 464: 3 s.h.**Relief Printmaking II**

Builds on the information presented in Relief Printmaking I. Starts at an intermediate level technically and builds into an advanced understanding and working knowledge of the process. Covers linocut, woodcut, alternative relief matrices, color reduction, large format, mixed media, relief monoprinting and multiple block relief printing. Students will be expected to develop a cohesive body of work from the projects and a personal investigation into artmaking. Offered periodically. Prereq: ART 364.

ART 465: 3 s.h.**Intaglio Printmaking II**

Explores multiple approaches to creating intaglio prints. Builds on the techniques in Intaglio Printmaking I and builds into an advanced understanding and working knowledge of the process. Covers sugar lift, white ground, toner transfers, spitbite, versacel, collagraph solar plates, chine colle, à la poupée inking, monoprinting and multiple-plate color printing. Offered periodically. Prereq: ART 365.

ART 467: 3 s.h.**Water-based Silkscreen Printmaking II**

Explores multiple approaches to creating water-based silkscreen prints. Starts technically with the information presented in Water-based Silkscreen I and builds into an advanced understanding and working knowledge of the process. Covers variations on previous stencil preparations and printing, including large format, mixed media and monoprinting. A strong focus will be on the application of the process to develop a body of work based on a personal investigation into artmaking. Offered periodically. Prereq: ART 367.

ART 468: 3 s.h.**Mixed Media Printmaking**

Explores the strengths of multiple printmaking techniques to create editions of color prints. Utilizes information previously covered in any of the 300-level printmaking courses. Starts at an intermediate technical level and builds into an advanced understanding and working knowledge of the printmaking process. Covers monoprinting, chine colle, collage, relief samples, electrostatic printmaking, solar plate etching, waterless lithography, hand coloring and color printing. Offered infrequently. Prereq: 300-level printmaking course.

ART 469: 3 s.h.**Contemporary Issues in Printmaking**

Explores current trends, conceptual applications and contemporary formats surrounding printmaking. Utilizes information previously covered in any of the 300-level printmaking courses as the base for additional techniques and to build a working knowledge of printmaking. Starts at an intermediate technical level and builds into an advanced understanding and working knowledge of the processes. Covers artist's books, mail art, nontraditional surfaces, computer applications for traditional prints, mixed-media prints, and discusses commercial processes and their application in fine art. Offered infrequently. Prereq: 300-level printmaking course.

ART 563, 564: 3-6 s.h.**Printmaking***Sculpture, Fine Art Metals & Ceramics***ART 282: 3 s.h.****Sculpture I (G1)**

An introduction to sculpture as a three-dimensional form of artistic expression through a variety of sculptural approaches. Covers the critical, the productive and the evaluative aspects of sculpture as art. Offered fall, spring.

ART 382: 3 s.h.**Sculpture II**

Emphasis on continued development of individual artistic expression, with emphasis on contemporary sculptural approaches. Offered fall, spring. Prereq: ART 282.

ART 482: 3 s.h.**Sculpture III**

Covers further study in sculpture. Students work toward developing a personal idiom of expression. Offered fall, spring. Prereq: ART 382.

ART 483: 3 s.h.**Sculpture IV**

Advanced study in sculpture. Student continues to develop style and technique while discovering personal artistic direction. Offered fall, spring. Prereq: ART 482.

ART 582, 583: 3-6 s.h.**Sculpture****ART 291: 3 s.h.****Intro: Fine Art Metals/Jewelry (G1)**

Introduces jewelry and metals as a form of artistic expression. The student seeks creative solutions to visual problems while employing various metalworking techniques and media. Emphasizes basic techniques of cutting, piercing, soldering, forging, forming and finishing of non ferrous metals. Critical analysis and evaluation of jewelry and metal art are central to the course. For both art majors and non-art majors. Offered fall, spring.

ART 391: 3 s.h.**Fine Art Metals/Casting (G1)**

Continued development of individual artistic expression in jewelry and metals, with emphasis on artistic inventiveness and personal style. Covers lost wax casting for jewelry scale work, alternative casting methods, mold making, chain making and marriage of metals. Critical analysis and evaluation of jewelry and metal art are central to the course. Offered fall, spring. Prereq: ART 291.

ART 491: 3 s.h.**Fine Art Metals/Form Emphasis**

Further study of jewelry and metals as an art form in which the student is encouraged to develop an original aesthetic style while exploring and employing advanced technical processes. Covers forming nonferrous metals using techniques such as anticlastic and sinclastic forming, raising, fold forming, chasing and repoussé, and tool making. Projects will focus on creating volume using these various techniques. Problem solving and critical analysis are emphasized in this course, along with professional practices/portfolio development. Offered fall. Prereq: ART 391.

ART 492: 3 s.h.**Advanced Fine Art Metals/Jewelry**

Advanced study in jewelry and metals in which the student continues to develop style and techniques while discovering personal artistic direction. Covers techniques including surface embellishment, filigree, stonesetting, and mechanisms to be used as tools for aesthetic expression. Expands student awareness of historical and contemporary jewelry/metalwork while incorporating concept with craft. Problem solving and critical analysis are emphasized in this course, along with professional practices/portfolio development. Offered spring. Prereq: ART 391.

ART 591, 592: 3-6 s.h.**Fine Art Metals****ART 295: 3-6 s.h.****Ceramics I: Handbuilding (G1)**

Introduces ceramic materials and processes utilizing handbuilding and sculpting methods. Emphasis on the productive, critical, cultural and historical aspects of ceramics as a form of artistic expression. Students seek creative solutions to visual problems. For both non-art and art majors. Offered fall, spring.

ART 296: 3-6 s.h.**Ceramics I: Wheel Throwing (G1)**

Introduces ceramic materials and processes utilizing the potter's wheel. Emphasis on the productive, critical, cultural and historical aspects of ceramics as a form of artistic expression. Wheel throwing and glazing techniques are employed as students seek original, creative solutions relating to function and aesthetics. For both non-art and art majors. Offered fall, spring.

ART 297: 3 s.h.**Ceramics II**

Development of ceramic materials and processes as a means of self-expression. Introduces glaze preparation, experimentation and basic glaze chemistry and firing techniques. Offered fall, spring. Prereq: ART 295 or 296.

ART 396: 3 s.h.**Ceramics III**

Development of the student's own investigation of material and means of self-expression using ceramic materials and processes. An in-depth study related to the work being produced. Offered fall, spring. Prereq: ART 297.

ART 497: 3 s.h.**Ceramics IV**

Advanced study in ceramics in which students continue to develop ideas, techniques and style as they pursue their own artistic direction. Offered fall, spring. Prereq: ART 396.

ART 596, 597: 3-6 s.h.**Ceramics***Convergent Courses***ART 331: 3 s.h.****Book Arts**

Explores the concept of the book as an art form. Emphasis will be on the use of sequencing to express artistic storytelling, narrative, multiples and one-of-a-kind books. Both traditional and contemporary bookbinding techniques will also be reviewed and utilized. Offered periodically.

*Studio Topics***ART 486: 3 s.h.****Special Topics in Studio Art**

Repeatable to 6 credits if topics vary. Prereq: ART 242, junior or senior standing.

*Independent Study***ART 490: 3 s.h.****Beyond Making: Strategies for Success**

Explores strategies for success in the fine art world beyond the college classroom and prepares students to tackle the business aspect of a fine art career. Students will build their formal portfolio, conduct an exhibition of their work and learn standard arts business practices such as exhibiting work, networking, advertising, branding, marketing and self-promotion. Entrepreneurial practice is utilized while students learn to write professional materials while building an online presence. Offered spring. Prereq: senior standing.

ART 494: 3 s.h.**Studio Capstone: Thematic Exploration in the Visual Arts**

Capstone studio seminar focuses on a rotating theme. Studio assignments are used to encourage creative problem solving and intellectual risk taking to create a range of solutions using different artistic media. Students will be presented with challenging ideas, historical precedents, theory and contemporary artistic approaches related to the selected theme. Offered periodically. Prereq: an advanced studio course.

ART 498: 1-3 s.h.**Independent Study in Art**

For further information on independent study, see the *Special Academic Opportunities* section.

GRADUATE-LEVEL COURSES

A majority of 500-level courses are open to qualified undergraduates with permission from the instructor. For course descriptions, please refer to the Graduate Catalog.

ART 533, 534: 3 s.h. each

Drawing

ART 552, 554: 3 s.h. each

Painting

ART 553, 555: 3 s.h. each

Watercolor and Related Media

ART 563, 564: 3 s.h. each

Printmaking

ART 567: 3 s.h.

Fine Art Photography

ART 582, 583: 3 s.h. each

Sculpture

ART 588, 589: 3 s.h. each

Topics in Art History

ART 591, 592: 3 s.h. each

Fine Art Metals

ART 596, 597: 3 s.h. each

Ceramics

AUTOMATION & INTELLIGENT ROBOTICS ENGINEERING TECHNOLOGY

See Applied Engineering, Safety & Technology

BIOCHEMISTRY

See Chemistry

BIOLOGY

College of Science and Technology

Professor Hoover, chairperson

Associate Professor Cebra-Thomas, allied health coordinator

Professors Boal, Cosentino, Didier, Hardy, Hepfer, Piperberg, Wallace, Whisenton-Davidson, Yocom

Associate Professors DiBartolomeis, Ladd, Wagner

Assistant Professors Haines, Horton

Respiratory Therapy Clinical Faculty: Chrissos, Harleman

Bachelor of Arts in Biology and Bachelor of Science in Biology

The Department of Biology offers three degrees and 11 options leading to the baccalaureate degree. The requirements are very similar for all programs during the first two years, so any change in career emphasis need not involve any major loss of time or credits. The department also offers minors in biology and molecular biology/biotechnology.

The program leading to the Bachelor of Arts degree is broad, embracing interdisciplinary study of cell and molecular biology, plant and animal science, and population biology. Programs can be tailored to prepare the student for employment or graduate study in a variety of biology subdisciplines.

The program leading to the Bachelor of Science degree provides the student with an opportunity to elect a substantial number of courses in a specific area of biology. This program provides a strong background for admission to graduate or professional school and prepares the student for employment in the field of biology upon graduation.

Options available within the B.S. program include animal behavior, botany, environmental biology, marine biology, molecular biology/biotechnology, respiratory therapy, medical technology, nuclear medicine technology, pre-optometry, pre-athletic training and pre-podiatry.

The animal behavior option provides training in both the biological mechanisms and the evolutionary functions of behavior. Students completing this option are prepared for a career in applied animal behavior or for graduate study.

Students in the botany option concentrate on the study of plants while obtaining a broad background in biology. This option effectively prepares those interested in professions in horticulture or plant sciences, and in advanced graduate study in botany.

The environmental biology option permits students to concentrate in ecology and enables them to gain expertise that will make them competitive in industry, governmental agencies and graduate school.

The marine biology option encourages students to choose electives in the marine biology area. Many marine science courses are offered at our field station at Wallops Island, Virginia, since they usually involve significant field work. For more information on the field station, see “Chincoteague Bay Field Station at the Marine Science Consortium” in the *Special Academic Opportunities* section.

The molecular biology/biotechnology option allows students to concentrate in genetics, cell and molecular biology. The courses required for this option complement each other, training students in a variety of laboratory methods and enabling students to gain the theoretical understanding and technical expertise currently needed to be competitive in industry and graduate school.

A dual-degree program is offered through Millersville University and West Chester University. Millersville University students who wish to obtain a degree in biology/pre-athletic training will simultaneously complete the athletic training degree requirements at West Chester University. Students will meet the general education, biology and pre-athletic training requirements at Millersville. Athletic training credits will be earned via distance-learning technologies and one summer of mandatory coursework at West Chester. Upon completion, students will earn two bachelor's degrees from two universities in four years. For more information, please also refer to the B.S., Biology, Pre-Athletic Training Option description in the *Wellness & Sport Sciences* section of this catalog.

After completing three years of undergraduate study, students in the medical technology (clinical/medical laboratory science) program are eligible to apply to an accredited hospital-based medical technology program for one year of clinical laboratory experience, after which they will be awarded the Bachelor of Science degree and will be eligible to sit for the national certification examination. Currently, Millersville is affiliated with three hospital-based medical technology (clinical/medical laboratory science) programs.

After completing three years of undergraduate study, students in the nuclear medicine technology program are eligible to apply for admission to one of the member hospitals of the Pennsylvania College of Health Sciences of Nuclear Medicine Technology for one year of hospital training, after which they will be awarded the Bachelor of Science degree and will be eligible to sit for the national certification examination.

An agreement between Millersville University and Salus University (formerly the Pennsylvania College of Optometry) in Philadelphia allows students in the optometry option to complete three years of undergraduate study at Millersville and then transfer to Philadelphia for the first year of study in the doctoral program. Students who complete the year with good grades receive a B.S. in biology from Millersville University, and after three additional years earn the Doctor of Optometry degree.

A cooperative option exists between Millersville University and the Temple University School of Podiatric Medicine. This 3/4 pre-podiatry program allows students to transfer to the professional school after satisfactorily completing 99 semester hours at Millersville University. After successful completion of the basic science courses at the Temple University School of Podiatric Medicine, students are awarded a B.S. in biology from Millersville University. Three recommended Millersville students a year have reserved spaces for admission to the podiatric college, where graduation after four years earns a D.P.M. degree.

Millersville University has recently entered into an Early Acceptance Program (EAP) agreement with the Lake Erie College of Osteopathic Medicine (LECOM) for programs in osteopathic medicine, dentistry and pharmacy. The current agreement is a “4+4 year program” and is designed for incoming freshmen and second-year students. Students who are interested in the EAP must be accepted by LECOM, either as an incoming freshman or before completing their sophomore year, and complete their degree at Millersville University. (EAP students will need to take the MCAT and complete an online application before they can enroll at LECOM.) Accepted students must do well during each academic semester at Millersville but will have a guaranteed seat in the classroom at LECOM.

Millersville University is the sponsoring institution for the respiratory therapy program. After successfully completing three years of study at the University, students enter the 16-month clinical phase at Lancaster Regional Medical Center. Admission into the clinical phase is competitive and not guaranteed. At the end of the clinical phase, they are awarded the Bachelor of Science degree and a certificate in respiratory therapy, and will be eligible to sit for the national credentialing examination.

The education curriculum leads to the Bachelor of Science in Education, with secondary education certification in biology.

Individualized programs in pre-medicine, pre-dental, pre-optometry, pre-podiatry and pre-veterinary medicine are organized with the program advisor.

Retention-in-the-Major Policy

University requirements for retention must be met. In addition, all biology majors must earn grades of C- or higher in all core courses (BIOL 101, 211, 221, 343, 362, 364) required for their option. These requirements must be satisfied before completion of 90 Millersville University credit hours. Those who change their major or option, and transfer students with more than 60 credits must satisfy these requirements before completing 45 additional credits. Those transferring into the major may substitute BIOL 100 for BIOL 101 if they earn a grade of B- or higher in this course.

For most biology majors, the core would include all six courses. Those in allied health options (medical technology, nuclear medicine technology, optometry, pre-podiatry, respiratory therapy and pre-athletic training), who are not required to complete six core courses, would be required to earn a C- or higher in all of the core courses required for that particular option.

COURSE REQUIREMENTS

Biology Major (B.A.): 120 s.h.

BIOL 101, 211, 221, 343, 362, 364, and 470 or 472. Electives to bring total biology credits to 33. 16 s.h. chemistry; 8 s.h. physics; 7 s.h. mathematics/computer science, including calculus (MATH 161); 3 s.h. earth sciences (200 level or above). Foreign language through intermediate level or equivalent.

Biology Major (B.S.): 120 s.h.

BIOL 101, 211, 221, 343, 362, 364, and 470 or 472. Electives to bring total biology credits to 43. 24 s.h. chemistry; 8 s.h. physics; 7 s.h. mathematics/computer science, including calculus (MATH 161).

Biology Major (B.S.): 120 s.h.**Animal Behavior Option**

BIOL 101, 211, 221, 343, 362, 364, 472, 485. Electives to bring total biology credits to 46. 16 s.h. chemistry; 8–10 s.h. physics; 7–8 s.h. mathematics.

Biology Major (B.S.): 120 s.h.**Botany Option**

BIOL 101, 211, 221, 325, 343, 362, 364, 427, 436, and 470 or 472. Electives to bring total biology credits to 45. 20 s.h. chemistry; 8 s.h. physics; 7 s.h. mathematics/computer science, including calculus (MATH 161).

Biology Major (B.S.): 120 s.h.**Environmental Biology Option**

BIOL 101, 211, 221, 343, 344, 362, 364, 375 and 472. 6 s.h. of directed electives from BIOL 443, 445, 446 and 447. Required taxa-based BIOL (325 recommended); 1–3 s.h. Research in Environmental Biology. Electives to bring total biology credits to 49. 16 s.h. chemistry; 8 s.h. physics; 4 s.h. calculus; 6–8 s.h. environmental science.

Biology Major (B.S.): 120 s.h.**Marine Biology Option**

BIOL 101, 211, 221, 291 or 290/292, 343, 362, 364, 375 and 472. 9 s.h. of directed electives of marine biology courses at a marine field station. Electives at the 300–400 level to bring total biology credits to 47. 19–20 s.h. chemistry and earth sciences (including ESCI 261); 8 s.h. physics; 4 s.h. calculus (MATH 151 or 161).

Biology Major (B.S.): 120 s.h.**Molecular Biology/Biotechnology Option**

BIOL 101, 211, 221, 343, 362, 364, 462, 466 and 472. Electives to bring total biology credits to 39. 24 s.h. chemistry; 8 s.h. physics; 7 s.h. mathematics/computer science, including calculus (MATH 161).

Biology Major (B.S.): 120 s.h.**Medical Technology Option**

BIOL 101, 211, 257, 362, 364, 454 and 461. Biology electives or MATH 235 to bring total nonclinical major credits to 30. 16 s.h. chemistry; 4 s.h. physics; MATH 160, 161 or 163. 30 s.h. of clinical laboratory study from a hospital program in medical technology approved by the National Accrediting Agency for Clinical Laboratory Sciences.

Biology Major (B.S.): 120 s.h.**Nuclear Medicine Technology Option**

BIOL 101, 211, 257, 356, 362, 364 and 375. 16 s.h. chemistry; MATH 160, 161 or 163; 8 s.h. physics. 28 s.h. of clinical laboratory study in nuclear medicine technology at the Lancaster General College of Nursing and Health Sciences School of Nuclear Medicine Technology.

Biology Major (B.S.): 120 s.h.**Optometry Option**

BIOL 101, 211, 362, 364, 375, 461 and 472. 20 s.h. chemistry; 7 s.h. mathematics/computer science, including calculus (MATH 161 or 163); 8 s.h. physics; 3 s.h. psychology. 23 s.h. transfer credits upon completion of one year at the Pennsylvania College of Optometry.

Biology Major (B.S.): 148 s.h.**Pre-Athletic Training Option**

BIOL 101, 211, 254, 255, 352, 362 and 375. 16 s.h. chemistry; 8 s.h. physics; 4 s.h. mathematics (MATH 161); 19 s.h. Wellness & Sport Sciences (WSSD) and 38 athletic training credits earned via distance-learning technologies and one summer of mandatory coursework at West Chester University. Dual-degree program with West Chester University. See the curriculum sheet for appropriate courses.

Biology Major (B.S.): 120 s.h.**Pre-Podiatry Option**

BIOL 101, 211, 257, 356, 362, 364 and 435. 20 s.h. chemistry; 8 s.h. physics; MATH 161 or 163; 6 s.h. psychology. 24 s.h. transfer credits from the Pennsylvania College of Podiatric Medicine.

Biology Major (B.S.): 120 s.h.**Respiratory Therapy Option**

BIOL 101, 257, 352, 356, 362, 364 and 461. 16 s.h. chemistry; 4 s.h. physics; MATH 161 or 163. The student will be eligible to begin the clinical phase of the respiratory therapy clinical program at the completion of 84 s.h. After the successful completion of 36 s.h. in the clinical phase, the student will be eligible to apply for graduation for the B.S. biology degree, respiratory therapy option. In order to receive the respiratory therapy certificate to be eligible to practice as a registered respiratory therapist (RRT), the respiratory therapy major will need to complete the second part of the clinical training, which includes an additional 27 s.h. (Clinical II coursework). The respiratory therapy certificate is required for the student to qualify for certification examinations. Completion of the post-baccalaureate clinical program (Clinical II coursework) also is necessary for employment as a respiratory therapist. See the *ADA Policy* section of this catalog for relevant respiratory therapy ADA information.

Biology Major (B.S.Ed.): 126 s.h.**Certification in Secondary Education**

BIOL 101, 211, 221, 343, 362, 364, 375 and 473. Electives to bring total biology credits to 32. 16 s.h. chemistry; 8 s.h. physics; 3 s.h. earth sciences (200 level or above); MATH 160, 161 or 163. Professional education courses (27 s.h.): EDFN 211, 241 and 330; EDSE 321, 435 and 461. Refer to *Admission to Advanced Professional Studies and Certification (Education Majors)* in this catalog for more information.

Biology Minor

BIOL 100 (B or higher) or BIOL 101 (C- or higher) and two from BIOL 211, 221, 343, 362 and 364. Electives at the 200–400 level to bring total biology credits to 20, with at least 6 s.h. at the 300 level or above.

Molecular Biology/Biotechnology Minor

BIOL 100 (B or higher) or BIOL 101 (C- or higher) and BIOL 362, 364, 462 and 466.

Bachelor of Science in Allied Health Technology

The Department of Biology offers one degree and four options leading to the baccalaureate degree in allied health technology. The requirements are initially very similar for each of the options so that any change in career emphasis need not involve any major loss of time or credits.

A dual-degree program is offered through Millersville University and West Chester University. Millersville University students who wish to obtain a degree in allied health technology/pre-athletic training will simultaneously complete the athletic training degree requirements at West Chester University. Students will meet the general education, allied health technologies and pre-athletic training requirements at Millersville. Athletic training credits will be earned via distance-learning technologies and one summer of mandatory coursework at West Chester. Upon completion, students will earn two bachelor's degrees from two universities in four years. For more information, please also refer to the pre-athletic training option description in the *Wellness & Sport Sciences* section of this catalog.

After completing three years of undergraduate study, students in the allied health technology/medical technology program are eligible to apply to an accredited hospital-based medical technology program for one year of clinical laboratory experience, after which they will be awarded the Bachelor of Science degree and will be eligible to sit for the national certification examination. Currently, Millersville University is affiliated with three hospital-based medical technology (clinical/medical laboratory science) programs.

After completing three years of undergraduate study, students in the allied health technology/nuclear medicine technology program are eligible to apply for admission to one of the member hospitals of the Pennsylvania College of Health Sciences of Nuclear Medicine Technology for one year of hospital training, after which they will be awarded the Bachelor of Science degree and will be eligible to sit for the national certification examination.

Millersville University is the sponsoring institution for the respiratory therapy program. After successfully completing two years of study at the University, students enter the approximately two-year clinical phase at Lancaster Regional Medical Center (LRMC). Admission into the clinical phase is competitive and not guaranteed. At the end of the clinical phase, students are awarded the Bachelor of Science degree and a certificate in respiratory therapy, and will be eligible to sit for the national credentialing examination. This degree option differs from the other B.S. allied health technology and B.S. degree programs offered by the biology department in its format and is termed a 2+2 year program that begins the clinical year in the summer following the sophomore year, not the end of the junior year, as is the case for the other degree options.

COURSE REQUIREMENTS**Allied Health Technology Major (B.S.): 148 s.h.****Pre-Athletic Training Option**

BIOL 100, 254, 255, 257, 352, 362, 364, 454, 461. Electives to bring total biology credits to 29. MATH 130, 160; 16 s.h. chemistry; 4 s.h. physics; 19 s.h. Wellness & Sport Sciences (WSSD) and 38 athletic training credits earned via distance-learning technologies and one summer of mandatory coursework at West Chester University. Dual-degree program with West Chester University. See the curriculum sheet for appropriate courses.

Allied Health Technology Major (B.S.): 120 s.h.**Medical Technology (Clinical Laboratory Science) 3+1 year Option**

BIOL 100, 254, 255, 257, 362, 364, 454, 461. Directed electives to bring total biology credits to 31 to 33. MATH 130, 160; 16 s.h. chemistry; 4 s.h. physics. 26 s.h. of clinical laboratory study from a hospital program in medical technology approved by the National Accrediting Agency for Clinical Laboratory Sciences.

Allied Health Technology Major (B.S.): 120 s.h.**Nuclear Medicine Technology 3+1 year Option**

BIOL 100, 254, 255, 257, 362, 364, 454, 461. Directed electives to bring total biology credits to 31 to 33. MATH 130, 160; 16 s.h. chemistry; 4 s.h. physics. 26 s.h. of clinical laboratory study in nuclear medicine technology at the Lancaster General College of Nursing and Health Sciences School of Nuclear Medicine Technology.

Allied Health Technology Major (B.S.): 120 s.h.**Respiratory Therapy 2+2 year Option**

BIOL 100, 254, 255, 352, 461. MATH 130. 6 s.h. chemistry; 4 s.h. physics. 54 s.h. of clinical laboratory study in respiratory therapy at the Lancaster Regional Medical Center (LRMC). All the courses for the respiratory therapy track are Millersville University-approved courses taught primarily by employees of LRMC.

COURSE DESCRIPTIONS**BIOL 100: 3 s.h.****General Biology (G2, L)**

An introduction to biology, with emphasis on cell structure, metabolism, genetics, behavior, ecology, adaptations, organ systems and evolution. 2 hours lec., 2 hours lab. No credit toward BIOL major.

BIOL 101: 4 s.h.**Foundations of Biology (G2, L)**

This introduction of biological principles provides the foundation of modern biological knowledge essential for all higher-level courses. Topics include cell structure and function, cellular reproduction, energy acquisition, biochemical pathways, mechanisms of inheritance, natural selection, speciation

and evolution. 2 hrs. lec., 1 hr. discussion, 3 hrs. lab. Offered fall, spring. Prereq: biology major or biology minor or permission of instructor. Prereq or coreq: MATH 101 or math placement in MATH 160 or higher.

BIOL 108/108H: 1 s.h.

Honors Freshman Biology Seminar

Emphasis on the intellectual and historical context of the core ideas of BIOL 100 and an in-depth exploration of ideas raised in lecture and laboratory. Satisfies the honors lab when taken with BIOL 100. 1 hr. seminar. Offered fall, spring. Prereq or coreq: BIOL 100 or 101.

BIOL 140: 4 s.h.

Introduction to Ecology (G2, L)

Introductory course in ecology (interactions of living organisms with the environment), evolution (adaptations of living organisms to the environment) and the environment of life on planet earth. Important applied ecological topics such as agriculture and forestry, exploitation of populations, effects of disturbance and climate change, and conservation of biological diversity also are examined. The course covers significant content of the Academic Standards for Environment and Ecology and the Middle Level Science Competencies as required by the Pa. Dept. of Education. 3 hrs. lec., 3 hrs. lab. No credit toward BIOL major. Prereq: ENGL 110, COMM 100 and completion of one course of MATH in college; acceptable courses include MATH 101, MATH 104 or higher. In addition, BIOL 100 or BIOL 101 is recommended.

BIOL 204: 3 s.h.

Human Biology (G2, W)

A nonlaboratory course in human biology designed specifically for those students planning to specialize in social work, psychology or related fields. An overview of the changes that take place in the course of a human lifetime; basics of human evolution, ecology, behavior, anatomy and physiology of the human organism are discussed. 3 hrs. lec. Offered fall, spring. Prereq: BIOL 100 or BIOL 101, or permission of instructor, and ENGL 110. No credit toward BIOL major.

BIOL 205: 3 s.h.

Heredity and Human Affairs (G2)

Genetics for non-majors with reference to human heredity and development. The social implications of recent advances in genetics are considered. 3 hrs. lec. Offered periodically. Prereq: BIOL 100 or BIOL 101, or permission of instructor or RN, and MATH 1**. No credit toward BIOL major.

BIOL 207: 3 s.h.

Human Sexuality (D, G2, W)

Study of the nature of human sexuality, particularly as it relates to biological phenomena. Discussions and films will cover the biology of human reproduction, biology of human sexual behavior and its implications. 3 hrs. lec. Offered periodically. Prereq: BIOL 100 or BIOL 101, or permission of instructor or RN, and ENGL 110. No credit toward BIOL major.

BIOL 208: 3 s.h.

Plants and People (G2)

Explores uses of plants and plant products by man and their impact on the development of civilization. Characteristics of plants that make them suitable for food, shelter, clothing, energy, medicines, entertainment, objects of worship, microclimate modification and aesthetic objects are discussed. 3 hrs. lec. Offered periodically. Prereq: BIOL 100 or BIOL 101, or permission of instructor. No credit toward BIOL major.

BIOL 211: 4 s.h.

Concepts of Zoology (G2, L)

Study of invertebrate and vertebrate animals. Classification, reproduction, development, ecology, physiology, behavior, genetics, scientific methodology (including simple statistical approaches) and evolution. Laboratory studies include microscopy, dissections, live observations, computer exercises and experimentation. 3 hrs. lec., 3 hrs. lab. Prereq: BIOL 100 or BIOL 101 with a grade of C- or higher for non-majors; B- or higher in BIOL 100 for biology majors.

BIOL 212/212H: 1 s.h.

Honors Zoology Seminar

Continuation of BIOL 211. Original investigations and/or readings and discussions of the zoological literature about the diverse adaptations of animals to their environments. Completion of both BIOL/HNRS 212 and BIOL 211 earns 5 credits to be counted as one course in the G2 block. BIOL/HNRS 212 may not be used independently to fulfill a G2 requirement. 1 hr. seminar. Offered periodically. Prereq: completion of BIOL 211 with a grade of B- or higher and member of University Honors College, or 3.35 GPA, or instructor's permission.

BIOL 221: 4 s.h.

Concepts of Botany (G2, L)

Consideration of features unique to plants, such as localized meristems and open growth, water relations, photosynthesis and cell structure. An integrated study of plant structure and function using angiosperms as principal examples. Includes brief discussions of plant and fungal diversity, plant ecology, evolution and economic botany. 3 hrs. lec., 3 hrs. lab. Prereq: BIOL 100 or BIOL 101 with a grade of C- or higher; B- or higher in BIOL 100 for biology majors.

BIOL 222/222H: 1 s.h.

Problem Solving in Botany

A botanical science investigation of a problem or series of problems. Students define a problem with a botanical basis, search appropriate literature, formulate hypotheses and collect appropriate information to test hypotheses through experimentation and data gathering. Completion of both BIOL/HNRS 222 and BIOL 221 earns 5 credits to be counted as one course in the G2 block. BIOL/HNRS 222 may not be used independently to fulfill a G2 requirement. 1 hr. seminar. Offered periodically. Prereq: completion of BIOL 221 with a grade of B- or higher and member of University Honors College, or 3.35 GPA, or instructor's permission.

BIOL 241: 3 s.h.

Principles of Ecology

Ecological principles underlying physiological adaptations of organisms to their environment, population dynamics, community analysis and ecosystem studies. Ecological and evolutionary theory emphasized, with examples from aquatic and terrestrial habitats. 3 hrs. lec. Offered fall, spring. Prereq: BIOL 100 or BIOL 101 and MATH 235, 151, 160 or 161. No credit toward BIOL major.

BIOL 247: 3 s.h.**Biodiversity: Origins and Extinctions (G2)**

Existing patterns of biological diversity (biodiversity), the processes and events that produce biodiversity, and the natural and unnatural factors that limit and/or reduce biodiversity. The ethics of biodiversity are also discussed. 3 hrs. lec. Offered periodically. Prereq: BIOL 100 or BIOL 101, and COMM 100. No credit toward BIOL major.

BIOL 254: 4 s.h.**Human Anatomy and Physiology I**

Study of the structure and function of the human body. This first semester of a two-semester sequence deals with the development, histology, gross anatomy, function and pathophysiology of the cutaneous, skeletal, muscular and nervous systems. 3 hrs. lec., 3 hrs. lab. Offered fall. Prereq: BIOL 100 or BIOL 101.

BIOL 255: 4 s.h.**Human Anatomy and Physiology II**

Study of the structure and function of the human body. This second semester of a two-semester sequence deals with the development, histology, gross anatomy, function and pathophysiology of the endocrine, circulatory, respiratory, digestive, urinary and reproductive systems. 3 hrs. lec., 3 hrs. lab. Offered spring. Prereq: BIOL 254.

BIOL 256: 3 s.h.**Nutrition (G2, W)**

Principles of adequate nutrition, including digestion and metabolism of foods; energy, protein, mineral and vitamin needs; environmental and industrial contaminants, additives and carcinogens; dietary treatment for nutritional disorders. 3 hrs. lec. Offered fall, spring. Prereq: BIOL 100 and ENGL 110. No credit toward BIOL major or minor. No credit given if credit earned for BIOL 352 or WSSD 452.

BIOL 257: 1 s.h.**Introduction to Allied Health Professions**

A survey of the various disciplines in the allied health field. Describes the type of training offered by hospitals for students who are planning to major in a health profession and for students who are undecided on a career. 1 hr. lec. Offered fall.

BIOL 266/266H: 1 s.h.**Advanced Principles of Cell Biology**

Cellular operations and processes: hormonal control of cell physiology, secretory activities and vesicular trafficking, control of cell division, neurotransmission, control of muscle contraction, signal transduction, interrupted genes, cell recognition, etc. Students explore and lead discussions on one of these topics. Completion of both BIOL/HNRS 266 and BIOL 263 earns 5 credits to be counted as one course in the G2 block. BIOL/HNRS 266 may not be used independently to fulfill a G2 requirement. 1 hr. seminar. Offered periodically. Prereq: completion of BIOL 362 or BIOL 263 with a grade of B- or higher and member of University Honors College, or 3.35 GPA, or instructor's permission.

BIOL 281: 3 s.h.**Behavioral Biology (G2, W)**

Provides an evolutionary and ethological frame of reference for further studies in psychology and animal behavior. Lectures supplemented by demonstrations and A-V media cover animal diversity, nervous systems, sensory reception, communication and behavior. 3 hrs. lec. Offered fall or spring. Prereq: BIOL 100 or BIOL 101, and ENGL 110. No credit toward BIOL major.

BIOL 291: 4 s.h.**Marine Biology (G2, L)**

Phylogeny, morphology and ecology of marine organisms. Similarities and differences in solutions to problems of life in the marine environment are stressed. 3 hrs. lec., 3 hrs. lab. Weekend field trips. Offered fall. Prereq: C- or higher in BIOL 211.

BIOL 318: 4 s.h.**Comparative Vertebrate Anatomy**

Functional and comparative anatomy of selected vertebrates with developmental and evolutionary perspectives. Lab primarily consists of dissection and histological analyses of animals representing various vertebrate classes. Comparisons between animals at the same level, and to see diverse features superimposed upon a common pattern. 3 hrs. lec., 3 hrs. lab. Offered spring, 2 of 3 years. Prereq: BIOL 211 and BIOL 362 or 263, or permission of instructor.

BIOL 324: 4 s.h.**Plant Biochemistry**

A study of enzymes and pathways involved in plant intermediary as related to plant cell structure, function and plant development. Topics include plant bioenergetics, biosynthesis of plant hormones and elicitor molecules, signal perception and transduction, and secondary metabolites (natural products). 3 hrs. lec., 3 hrs. lab. Offered spring. Prereq: BIOL 221 and BIOL 362 or BIOL 263, CHEM 232 or CHEM 235.

BIOL 325: 3 s.h.**Plant Systematics**

A survey of local vascular flora, use of dichotomous keys in identifying plants, distinguishing features of common plant families, principles of plant systematics. Phylogenetic, biosystematic and nomenclatural concepts are considered. 2 hrs. lec., 3 hrs. lab. Offered fall. Prereq: C- or higher in BIOL 221.

BIOL 327: 3 s.h.**Horticultural Science**

Principles of horticultural science, including regulation of plant growth, propagation and breeding, plant nutrition, pruning, plant diseases and special topics related to individual types of plants. Laboratory includes propagation and handling of plants in the greenhouse, and field trips. 2 hrs. lec., 3 hrs. lab. Offered spring. Prereq: BIOL 221 or permission of instructor.

BIOL 340: 3 s.h.**Perspectives in Environmental Awareness (P)**

Interdisciplinary study of current environmental problems and their implications on future habitability of the planet. Physical, biological and social aspects of alterations to ecosystems presented and solutions considered. Course includes lectures, open forums and student participation. Offered fall and spring. Prereq: COMM 100, ENGL 110, junior status and at least one science (G2 block) and one social science course (G3 block). Biology majors and minors may use this course as the general education perspective (P) requirement. This course may not be used as an elective within a biology degree program.

BIOL 343: 4 s.h.**Principles of Ecology and Evolution**

The basic concepts and principles of evolution and ecology. Topics include natural selection, genetic variation, macro- and microevolution, population genetics, evolutionary stable strategies, species concepts, biodiversity, extinction, reproductive strategies, population dynamics, the ecological niche concept, predation, competition, mutualism, parasitism, coevolution, biogeography, disturbance ecology, and ecosystem structure and function. 3 hrs. lec., 3 hrs. lab. Offered fall and spring. Prereq: BIOL 101 or 100 with a grade of C- or higher; B- or higher in BIOL 100 for biology majors; C- or higher in BIOL 211 and BIOL 221; MATH 151, 160 or math equivalent; ENGL 110.

BIOL 344: 3 s.h.**Population and Community Ecology**

An intermediate course that will explore population biology, species interactions, trophic structure, community organization, succession, island biogeography and biological diversity at a more advanced level than BIOL 343. The laboratory portion of the course will focus on the use of quantitative methods and manipulative experimental designs to verify fundamental principles and test new hypotheses. 2 hrs. lec., 3 hrs. lab. Offered fall or spring. Prereq: BIOL 343, MATH 151 or MATH 161, and BIOL 375.

BIOL 346: 3 s.h.**Ornithology (W)**

Ecology, behavior, taxonomy and evolution of birds, with emphasis on field studies. 2 hrs. lec., 3 hrs. lab. Weekend field trips. Offered spring. Prereq: C- or higher in BIOL 211.

BIOL 352: 3 s.h.**Nutritional Science (W)**

Biological and biochemical roles of nutrients for the proper functioning of the human body. Designed for students with a more advanced understanding of chemistry and math. Nutrition concepts will be used to design and evaluate personal diet plans. No credit given if credit earned for BIOL 256 or WSSD 452. (BIOL 256 does not count for biology majors or minors.) Offered fall or spring. Prereq: C- or higher in BIOL 362 or BIOL 263, ENGL 110.

BIOL 356: 5 s.h.**Functional Human Anatomy**

A systemic approach to the study of the structure of the human body, with discussion of general function. Course designed primarily for those planning to enter medical or allied health professions. Clinical laboratory experiences related to human anatomy. 3 hrs. lec., 4 hrs. lab. Offered spring. Prereq: C- or higher in BIOL 211 and BIOL 362 or BIOL 263.

BIOL 360: 4 s.h.**Histology**

Study of cellular architecture, with emphasis on cell and tissue function in mammalian systems. Laboratory component of the course will focus on preparation of specimens and use of special microscopy techniques to explore normal and altered cell function. 2 hrs. lec., 4 hrs. lab. Offered fall. Prereq: BIOL 362 or BIOL 263.

BIOL 362: 4 s.h.**Cell and Developmental Biology (G2, L, W)**

Cell structure and function, including cell ultrastructure, methods used in cell biology research, cell motility, signal transduction, cell division, macromolecules, metabolism and the cytomembrane system. Basic concepts in developmental biology are also covered: fertilization, early embryonic cleavage in model systems, cell-cell communication, extracellular matrix and research methods. Examples from developmental biology are employed to illustrate the functions and roles of cellular structures and processes. Laboratory includes isolation of cell components, fertilization and cleavage in sea urchins, microscopy and other techniques used in the study of cell and developmental biology. 3 hrs. lec., 3 hrs. lab. Offered fall and spring. Prereq: BIOL 100 or BIOL 101 with a grade of C- or higher; B- or higher in BIOL 100 for biology majors; ENGL 110; CHEM 112 (Prereq or Coreq).

BIOL 363: 3 s.h.**Medical Microbiology**

An in-depth exploration into the nature of disease-causing microorganisms, with an emphasis on medically important bacteria, viruses and fungi. This course will provide a comprehensive analysis of the structure of microorganisms, epidemiology and pathogenesis of microbial diseases, control of microbes, host responses to infection, vaccination strategies and antimicrobial therapy. 3 hrs. lec. Offered periodically in fall or spring. Prereq: BIOL 362 or BIOL 263.

BIOL 364: 4 s.h.**Foundations of Genetics and Molecular Biology**

Concepts and principles essential for a basic understanding of genetics and molecular biology are covered. Topics include Mendelian genetics, gene mapping, molecular structure of the gene, gene expression and regulation, chromatin structure, molecular methodologies, human genome project, population genetics and evolution. 3 hrs. lec., 3 hrs. lab. Offered fall, spring. Prereq: BIOL 100 or BIOL 101 with a grade of C- or higher; B- or higher in BIOL 100 for biology majors; CHEM 112.

BIOL 375: 3 s.h.**Biometry**

Use of statistical techniques in descriptive and experimental biology, and the use of mathematical models in describing biological phenomena. 3 hrs. lec. Offered fall, spring. Prereq: BIOL 100 or BIOL 101, and MATH 160.

BIOL 390: 3 s.h.**The Natural History of the Mid-Atlantic Shore (P)**

An introduction to the biological communities of the mid-Atlantic coast, emphasizing the interrelatedness of physical and biological factors, the importance of shore communities to people as seen through the arts and humanities, and the challenges of current environmental issues in the context of local history and public policy. 3 hrs. lec. Offered fall. No credit toward BIOL major. Student may not take both BIOL 291 and BIOL 390 for credit. Marine option students may not take this course to satisfy the perspectives requirement. Prereq: ENGL 110, COMM 100 and junior status.

BIOL 415: 3 s.h.**Mammalogy (W)**

Phylogeny, taxonomy, adaptations, behavior and ecological relationships of mammals. Acquisition of laboratory and field techniques is stressed. 2 hrs. lec., 3 hrs. lab. Weekend field trips. Offered periodically in fall. Prereq: C- or higher in BIOL 211.

BIOL 416: 3 s.h.**Entomology**

Introduction to insects, with emphasis on structure and function, behavior, adaptations, ecology, systematics, and economic and medical significance. Collecting, pinning and preservation techniques are covered. Field trips. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: C- or higher in BIOL 211.

BIOL 417: 3 s.h.**Parasitology**

Biology of parasites and their host/parasite relationships are considered. Parasites infesting humans and domestic animals stressed. Includes practical aspects of diagnosis. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: C- or higher in BIOL 211. BIOL 362 or BIOL 263 recommended.

BIOL 424: 3 s.h.**Mycology**

The taxonomy, morphology, physiology and ecology of fungi. Laboratory activities include surveys of local populations of fleshy fungi, fungal pathogens of plants and soil fungi; physiological studies on growth and reproduction; experimental studies of fungal ecology; and studies of comparative morphology of diverse fungal groups. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: C- or higher in BIOL 221 and BIOL 362 or BIOL 263.

BIOL 429: 3 s.h.**Plant Developmental Biology**

An overview covering both the basics and the most recent advances of plant development. Processes including embryogenesis, seed/fruit development, seed germination and meristematic development as well as the regulation of these processes will be discussed. Application of molecular biology, cell biology, genomics and bioinformatics in the study of plant development will be addressed, as well as those of plant anatomy and plant genetics. Practical techniques of plant biotechnology as well as electron and light microscopy will be taught. Students will do small research projects relevant to plant development. 2 hrs. lec., 3 hrs. lab. Offered fall. Prereq: C- or higher in BIOL 221, BIOL 362 or BIOL 364, or permission of instructor.

BIOL 435: 3 s.h.**Animal Physiology**

Structure and functions of animals. Independent investigation and recent physiological theories emphasized. 2 hrs. lec., 3 hrs. lab. Offered fall. Prereq: C- or higher in BIOL 211 and BIOL 362 or BIOL 263; CHEM 112.

BIOL 436: 3 s.h.**Plant Physiology**

Life processes of plants. Water relations, nutrition, translocation, photosynthesis, metabolism, growth, development and reproduction will be considered, with particular reference to higher plants. 2 hrs. lec., 3 hrs. lab. Offered spring. Prereq: BIOL 221 and BIOL 362 or BIOL 263. CHEM 231 or 235 recommended.

BIOL 437: 3 s.h.**Endocrinology**

The role of hormones in the integration and control of physiological and developmental processes is stressed as well as the molecular mechanism of hormone action. 3 hrs. lec. Offered fall. Prereq: BIOL 362 or BIOL 263.

BIOL 438: 3 s.h.**Neurobiology (W)**

The structure and function of the nervous system. Lecture and laboratories will cover a broad range of topics, from the molecular to the cognitive. One of the major themes is the relationship between the brain and behavior. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: BIOL 362 or BIOL 263, and ENGL 110.

BIOL 443: 3 s.h.**Conservation Biology**

Population ecology and genetics applied to the conservation of rare, threatened and endangered species. Emphasis on the regulation of abundance, theoretical models of population dynamics, experimental design, sampling approaches and case studies. 2 hrs. lec., 3 hrs. lab. Offered annually (usually in fall). Prereq: C- or higher in BIOL 101, 343.

BIOL 445: 3 s.h.**Aquatic Biology**

Study of the physical and biotic aspects of temporary pools, streams, ponds and rivers. Field trips. 2 hrs. lec., 3 hrs. lab. Offered spring. Prereq: BIOL 211, 221, PHYS 132 or 232 desirable.

BIOL 446: 3 s.h.**Ecosystems (W)**

Ecosystem processes, including nutrient cycles, energy budgets and trophodynamics, are discussed for terrestrial, coastal and marine ecosystems. Processes are discussed for ecosystem types such as those controlled by fire, volcanism, chemosynthetic bacteria, detrital food resources, herbivory and predation. Ecosystems viewed in a global perspective to understand global carbon and nutrient cycles. 3 hrs. lec./discussion. Offered spring of even years. Prereq: BIOL 343 and ENGL 110.

BIOL 447: 4 s.h.

Chesapeake Bay System (W)

Study of the effects of human activity on the ecosystems of the Chesapeake Bay System and the role of ecological principles in current restoration efforts. Investigation of how agricultural practices, riparian forests, tidal and nontidal wetlands, and urban development affect the input of nutrients and toxins, and the estuarine processes in the Chesapeake Bay that cause eutrophication and population declines in fisheries. 2 hrs. lec., 4 hrs. lab/field. Offered fall. Prereq: BIOL 343 and ENGL 110.

BIOL 454: 2 s.h.**Immunology**

The development of humoral and cellular immunity to an antigenic stimulus is discussed. Role of these mechanisms in immunogenetics, immunologically mediated disease, immunological protection against infectious agents and cancer also considered. 2 hrs. lec. Offered spring. Prereq: BIOL 362 or 263.

BIOL 461: 3 s.h.**General Microbiology**

The structure, physiology and ecology of microorganisms. Symbiotic associations between organisms will be examined in depth. Principles of microbial virulence and immunology are also discussed. Laboratory investigations include the isolation and identification of unknown microorganisms. 2 hrs. lec., 3 hrs. lab. Offered fall. Prereq: BIOL 362.

BIOL 462: 4 s.h.**Molecular Biology (W)**

The molecular and macromolecular basis of life. The structure and function of cellular macromolecules, molecular techniques of genetic analysis and the control of cellular processes will be examined in depth. 3 hrs. lec., 3 hrs. lab. Offered fall. Prereq: BIOL 362, 364 or 365, and ENGL 110. BIOL 461 or CHEM 326 recommended.

BIOL 463: 4 s.h.**Virology**

Comprehensive investigation of animal viruses. In-depth analysis of virus particles, modes of replication, epidemiology of virus infection, virus-host interactions and vaccines. Focus is on medically important viruses such as herpes, influenza, hepatitis and human immunodeficiency viruses. Laboratory exercises include the culture and analysis of viruses in bacterial and mammalian systems. 3 hrs. lec., 3 hrs. lab. Offered fall. Prereq: 364 or permission of instructor.

BIOL 465: 3 s.h.**Developmental Biology**

Principles of development and differentiation in animals and plants at the molecular and supramolecular levels of organization. The laboratory includes both experimental and descriptive embryology. 2 hrs. lec., 3 hrs. lab. Offered spring. Prereq: BIOL 362 or 263, 364 or 365, or permission of instructor.

BIOL 466: 3 s.h.**Molecular and Cellular Techniques**

Application and theory of techniques commonly used in biotechnology, and cell and molecular biological research. Cell culture, plant tissue culture, immunological techniques, cell fusion, radioisotope labeling and detection, centrifugation, microscopic techniques and electrophoretic protocols will be covered in depth. Intended for biology B.S. majors in the molecular biology/biotechnology option. 5 hrs. integrated lecture/lab. Offered spring. Prereq: BIOL 462. BIOL 461 recommended.

BIOL 467: 3 s.h.**Human Genetics: Analysis and Applications (W)**

Applications of traditional and molecular approaches in understanding the genetic basis for human traits. Gene mapping and identification, cytogenetics and DNA sequence analysis will be covered in depth. Gene function, regulation, mutations and cloning will be explored in the context of human diseases. The Human Genome Project, genetic diagnostics, gene therapy and transgenic organisms will be addressed, along with the genetic basis of cancer, behavior, immunity and development. Genetic counseling and medical genetics will be discussed. 3 hrs. lec./discussion. Offered annually. Prereq: BIOL 364 or 365, ENGL 110.

BIOL 470: 1-2 s.h.**Biology Colloquium**

An opportunity to meet visiting scientists and to discuss their research work. Students will read and discuss, in a seminar format, assigned papers prior to the presentation of the colloquium by the visiting scholar. In addition, they will be expected to participate in discussions with the speaker after the colloquium, hosted by the Department of Biology. Offered periodically. Prereq: BIOL 100 or BIOL 101. Other courses indicated by instructor.

BIOL 471: 1-4 s.h.**Topics in Biology**

Detailed investigations of a topic of current interest. Topic to be announced each time course is offered. Offered periodically. Prereq: upperclass standing or permission of instructor.

BIOL 472: 1-2 s.h.**Seminar in Biology**

Group discussions. General theme to be determined by professor. Offered annually. Prereq: 16 s.h. of biology and courses indicated by the instructor.

BIOL 473: 1 s.h.**Seminar-Methods of Teaching Biological Issues in the Secondary School**

A seminar for prospective life science teachers to consider methods a teacher might employ to present controversial aspects of biology in intellectually honest, balanced ways which also demonstrate sensitivity to the various moral, ethical and political dilemmas secondary school students may encounter. 1 hr. lecture. Offered annually. Coreq or prereq: EDSE 435; required of all B.S.Ed./BIOL students prior to or with EDSE 461.

BIOL 485: 3 s.h.**Animal Behavior (W)**

Animal groups from protozoa to mammals studied from an ethologist's point of view. Inheritance, learning, development and motivations will be covered. 2 hrs. lec., 3 hrs. lab. Offered spring. Prereq: BIOL 343 and ENGL 110.

BIOL 487: 3 s.h.

Evolution

Broad survey of evolution, including development of evolutionary theory, history of life and mechanism of evolution. 3 hrs. lecture. Offered fall, spring. Prereq: 12 s.h. biology, including BIO 343, 364 or 365 and MATH 161.

BIOL 498: 1-3 s.h.

Independent Study in Biology

Student research on a topic agreed on with faculty supervisor. Applicant for independent study is required to submit a Request for Special Study Assignment form.

BIOL 489, 499: 1-4 s.h.

Honors Courses/Thesis

For the definition of honors course thesis and eligibility, refer to the *Special Academic Opportunities* section of this catalog.

Honors Courses

See course descriptions as listed within this department. Also see the *Honors* section of this catalog. BIOL 108, BIOL 212, BIOL 222, BIOL 266.

Marine Biological Science

The following courses in marine biological science are usually offered during summers at the Chincoteague Bay Field Station at the Marine Science Consortium. All courses 5 hrs. lec./lab.

BIOL 290: 3 s.h.

Coastal Marine Biology (G2)

Introduction to marine organisms, marine communities, and the physical, chemical and biological parameters that shape them; laboratory work will emphasize local coastal marine ecosystems. Weekend field trips. 3 hrs. lec., 3 hrs. lab. Offered summer, fall. Prereq: BIO 211 or 1 year college biology.

BIOL 292: 1 s.h.

Problem Solving in Marine Biology

An introduction to foundational topics within marine biology, including (1) quantitative reasoning for aquatic biologists, (2) marine geography and mapping, (3) life in a fluid environment, (4) marine aquarium systems, (5) scientific illustration, (6) electronic resources in marine biology, (7) internships, co-ops, jobs and careers in marine biology, and (8) current topics. Offered summer, fall. Prereq: placement in college-level mathematics.

BIOL 293: 3 s.h.

Coastal Ornithology

This course is designed so that the student will achieve a strong understanding of a variety of aspects in ornithology, with the strongest focus on field techniques, including identification. Material covered will include evolution, anatomy, physiology, behavior and ecology. A portion of the course will include an overview of the avian families of North America, especially those found in coastal regions along the mid-Atlantic seaboard. The field component for this course will include mist netting, census techniques and field identification. Emphasis will be placed on field research, and a portion of the course will involve the development of a novel research idea in ornithology. Prereq: 2 courses of introductory biology, or permission of the instructor.

BIOL 294: 3 s.h.

Coral Reef Ecology

Coral reefs are unique assemblages of life and one of the most appealing ecosystems in marine science. The focus of this course is to introduce students to the unique aspects of coral reefs, and to provide a working knowledge of reef species and reef ecology. Students will learn basic taxonomy, biology, ecology and conservation of coral reefs and the organisms associated with this habitat. Laboratory will consist of hands-on field experiences in a coral reef habitat. Students will learn techniques for study and assessment of marine habitats, and complete an independent project. Prereq: 2 semesters of biology and SCUBA certification prior to start of the course, or permission of the instructor.

BIOL 295: 3 s.h.

Marine Invertebrates

The invertebrate phyla, with emphasis on development, reproduction, structure, function and classification of selected marine organisms. Laboratory and field experience in collection, preservation and classification of the phyla.

BIOL 296: 3 s.h.

Marine Ecology

Interrelationships among animals, plants and physical and chemical aspects of the environment will be studied, with stress on adaptations for survival that are unique to the marine environment.

BIOL 392: 3 s.h.

Marine Mammals

The distribution, population size, physiology, evolution, adaptations and ecological relationships of marine mammals will be studied, with an emphasis on mammals of the Atlantic Ocean. This course will stress hands-on understanding of marine mammal physiology, behavior, population dynamics and species diversity. Laboratory and field work will include an extended off-campus field trip to facilities holding and/or studying marine mammals of the NE Atlantic Ocean. In addition, the laboratory portion of this course will emphasize data collection in the field, and subsequent analysis and presentation of the data through a required mini-research project.

BIOL 396: 3 s.h.

Marine Ichthyology

Marine fishes. Morphology, anatomy, physiology, systematics and behavior covered using specimens collected from nearby estuaries and the ocean. Zoogeography, life histories and speciation also discussed. Prereq: BIOL 100.

BIOL 397: 3 s.h.

Marine Botany

The taxonomy, ecology, distribution, life histories, physiology and economic status of marine and marine-fringe plants of the Middle Atlantic coast. Covers techniques of collecting, preserving, identifying and cataloging.

BIOL 495 or ESCI 465: 3 s.h.

Biological Oceanography

Physical, chemical and biological factors controlling marine populations; methods of sampling, identification and analysis. Prereq: BIOL 211 and 221; ESCI 261.

GRADUATE-LEVEL COURSES

All 500-level courses are open to qualified undergraduates.

BIOL 516: 4 s.h.

Aquatic Entomology

The approach is basically ethological rather than taxonomic. The biology, ecology, behavior and adaptations to an aquatic habitat will be studied in the field. Each student will undertake an individual biological study. Prereq: BIOL 416 and BIOL 445 or permission of the instructor. 3 hrs. lec., 3 hrs. lab. Offered periodically.

BIOL 564: 4 s.h.

Foundations of Genetics and Molecular Biology

Concepts and principles essential for a basic understanding of genetics and molecular biology are covered. Topics include Mendelian genetics, gene mapping, molecular structure of the gene, gene expressions and regulation, chromatin structure, molecular methodologies, Human Genome Project, population genetics and evolution. 3 hrs. lec., 3 hrs. lab. Offered fall, spring.

BIOL 589: 1–4 s.h.

Topics in Biology

Detailed investigations of a topic of current interest. Topic to be announced each time course is offered. Offered periodically.

Respiratory Therapy

The following courses are offered as needed for students in the clinical phase of the respiratory therapy program.

RESP 410: 2 s.h.

Acute Cardiopulmonary Care

This course is designed to give the student a complete understanding of artificial airways, manual artificial ventilation methods and cardiopulmonary resuscitation. A basic study of cardiac physiology and electrocardiograph interpretation will be discussed. Integrated lecture/lab. Prereq: BIOL 356 for the B.S. in biology; BIOL 254 and BIOL 255 for the B.S. in allied health technology. Basic Life Support for Healthcare Providers, for both programs.

RESP 411: 2 s.h.

Respiratory Care Techniques I

A study of the basic techniques of respiratory care, including professional organizations, ethics, legal aspects, aerosol pharmacology, lung hyper-inflation therapy and basic diagnostic appliances. Integrated lecture/lab. Prereq: BIOL 356 for the B.S. in biology; BIOL 254 and BIOL 255 for the B.S. in allied health technology.

RESP 412: 3 s.h.

Principles of Aerosol and Gas Therapy

A study of medical gas therapy, bland and pharmacologic aerosol administration, and related theory guides the learner in making sound judgments in their application. Particular attention is given to the operating principles of the devices used in this therapy and their use and maintenance. Integrated lecture/lab. Prereq: BIOL 356, CHEM 112 and PHYS 131 for the B.S. in biology; BIOL 254 and BIOL 255, CHEM 103 and CHEM 104, and PHYS 131 for the B.S. in allied health technology.

RESP 413: 4 s.h.

Respiratory Assessment and Therapeutics

The lungs and chest wall are studied to gain an understanding of breathing mechanics in health and disease. Therapeutic measures are considered as to their value in reducing the work of breathing imposed by disease. Each student learns to examine the pulmonary patient and to integrate and evaluate the findings. Bronchopulmonary hygiene, chest physical therapy techniques and an overview of pulmonary rehabilitation are introduced and discussed. Prereq: RESP 411, RESP 412.

RESP 414: 3 s.h.

Respiratory Care Techniques II

The chest-imaging component prepares the student to evaluate chest X-ray films and to recognize and track the progression/resolution of abnormalities. CT scanning and MRI are given emphasis proportional to their utilization in chest medicine. Measurement and calculation of volume, flow rate and ratios, and their physiologic significance, and testing procedures for performing various pulmonary function studies are included. Prereq: RESP 411.

RESP 415: 3 s.h.

Technical Aspects of Mechanical Ventilation

The mechanics of basic models: Discussion includes the mechanics of ventilator models classification, the control interrelation, the electro-pneumatic/microprocessor systems and the audiovisual alarm systems; a selection of current ventilator models are presented using workshops to provide hands-on experience in troubleshooting, setup, control function, alarm setting and mode change. Prereq: RESP 421.

RESP 417: 3 s.h.

Respiratory Care Techniques III (W)

The course provides an overview of cardiovascular physiology, management of invasive monitoring catheters, calculation of all commonly used mechanics, and interpretation of data in pathologic states. Also, each student researches, prepares a journal-quality paper and presents a 40–50-minute verbal presentation on a selected pulmonary disease condition. Prereq: ENGL 110, RESP 414.

RESP 419: 2 s.h.

Respiratory Care in Alternate Sites

Alternate sites for respiratory care are studied to give the students a better understanding of the career opportunities within their reach. The students will understand their role as respiratory therapists in the home care, subacute care and pulmonary rehabilitation settings. Lecture, guest speakers, a camp experience, a one-day site visit and in-class presentations are included. Prereq: RESP 413.

RESP 420: 3 s.h.

Arterial Blood Gas Analysis

The physiologic role of various gas pressures (alveolar gas pressures, blood gas pressures, inspired gas pressures, tissue gas pressures, etc.) and pulmonary abnormalities causing hypoxemia are discussed. Control of ventilation, oxygen transport (including oxygen content and oxygen dissociation curve) and carbon dioxide transport are presented. The student will interpret acid-base imbalances and blood gas abnormalities. Prereq: CHEM 112 and PHYS 131 for the B.S. in biology; CHEM 103, CHEM 104 and PHYSICS 131 for the B.S. in allied health technology.

RESP 421: 2 s.h.

Physiology of Mechanical Ventilation

Aspects of continuous positive and negative pressure breathing are discussed. Special emphasis is placed on the complications of mechanical ventilation and analysis of various waveform patterns produced by different ventilator modes. Theory and measurement of airway resistance and lung thorax compliance are presented. The student learns guidelines and calculations for correct ventilator setup. Prereq: RESP 411 and RESP 420.

RESP 422: 2 s.h.

Pharmacology

A concise core of pharmacologic knowledge that will be used by the respiratory therapist to understand how chemical agents affect disease processes. Emphasis is placed on the chemical and molecular structures, toxic aspects, actions and hazards of drugs. Prereq: CHEM 112 for the B.S. in biology; CHEM 104 for the B.S. in allied health technology.

RESP 423: 2 s.h.

Infectious Diseases

Infectious diseases resulting in respiratory infections, host defense mechanisms, the immunology of the respiratory system, and temporary or permanent failure of many protective mechanisms of the body to ward off infectious agents. Fluid and electrolyte management are stressed. Prereq: BIOL 461.

RESP 424: 2 s.h.

Noninfectious Diseases

Diseases of the airway, parenchyma and pleura are covered in an assessment-based format to understand the etiology, diagnosis, treatment and management of patients with noninfectious pulmonary diseases. Prereq: RESP 413.

RESP 425: 2 s.h.

Neonatology for the Respiratory Therapist

Uterine development of the embryo is discussed, with emphasis on the fetal pulmonary system. The respiratory and circulatory changeover of the neonate at birth is studied. Temperature regulation, signs of respiratory distress, oxygen administration, arterial blood analysis, and congenital abnormalities and disease states are studied with respect to the newborn. Prereq: BIOL 356 or BIOL 254/255.

RESP 460: 1 s.h.

Clinical Practice I

The student will complete three diagnostic lab units and three clinical skills lab units in general care therapeutics and general care patient management. Upon successful completion of each of the skills labs, the student will be scheduled for a clinical practice rotation in patient care. The students are assigned to a clinical preceptor to observe/practice/develop competency in their newly acquired clinical skills. Prereq: admission to the Program in Respiratory Therapy.

RESP 461: 2 s.h.

Clinical Practicum I

This course provides a 60-hour supervised clinical experience for each student enrolled. It immediately follows the completion of RESP 460, in which all of the general patient-care skills were presented, practiced in simulation, observed in patient care and practiced on patients. The expectation is that each student will progress to mastery in the assigned general patient-care clinical skills. The former 40 hours will be devoted to supervised practice, and the latter 20 hours will consist of further practice, with a focus on skill assessment through direct observation by a regular faculty member. Prereq: RESP 460.

RESP 462: 1 s.h.

Clinical Practice II

The student will complete three clinical skills lab units in critical-care therapeutics and critical-care patient management, and three diagnostic lab units. The format for each of these labs is similar to that of RESP 460. Upon successful completion of each of these labs, the student will be scheduled for a clinical practice rotation in patient care. The students are assigned to a faculty member to observe/practice/achieve competency in their newly acquired clinical skills. Prereq: RESP 461.

RESP 463: 3 s.h.

Clinical Practicum II

This course provides a 120-hour supervised clinical experience for each student enrolled. It immediately follows the completion of RESP 462, in which all of the critical-care patient-care skills were presented, practiced in simulation, observed in patient care and practiced on patients. The expectation is that each student will progress to mastery in the assigned critical-care patient-care clinical skills. The former 100 hours will be devoted to supervised practice, and the latter 20 hours will consist of further practice, with a focus on skill assessment through direct observation by a faculty member. Prereq: RESP 462.

RESP 464: 10 s.h.**Clinical Practicum III**

This course provides a 600-hour supervised clinical experience for each student enrolled. The final semester of the program is devoted to refinement of all skills through practicing with a great variety of equipment and procedures. Advanced techniques and procedures are stressed. A total of 16 structured weeks of clinical experiences are offered at contracted affiliated regional hospitals and medical centers. Students will accomplish learning objectives while assigned to various content experts and specialists. The focus is on pulmonary rehabilitation, home care, sleep medicine, pulmonary diagnostics, neonatal/pediatric critical care, advanced airway care, pulmonary medicine and adult critical care patient management. Each rotation area is complete with schedules, content outlines, specific learning objectives and assignments to be completed by the student. Prereq: RESP 463.

RESP 495: 2 s.h.**Respiratory Care Research**

Each student selects, designs and conducts a research project, individually or with a research partner. The project culminates in a verbal presentation of the research and a manuscript from each student suitable for publication. Each project is assigned a faculty advisor to oversee and guide the research. Prereq: permission of program director.

Millersville University Program in Respiratory Therapy ADA Standards

In keeping with its mission, goals, and in compliance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA), Millersville University and its consortium-affiliated hospital promote an environment of respect and support for persons with disabilities and will make reasonable accommodations. Individuals with disabilities is defined as those who currently have, have a record of having, or are regarded as having a physical or mental impairment that substantially limits one or more major life activities. Major life activities include caring for oneself, performing manual tasks, walking, seeing, hearing, breathing and working.

Individuals applying for admission, progression to clinical courses and graduation from the program in respiratory therapy must be able to meet the physical and emotional requirements of the academic program. In addition, students admitted must possess the following qualities:

- The emotional maturity and stability to approach highly stressful human situations in a calm and rational manner.
- The ability to make clinical judgments using critical thinking.
- The ability to adhere to ethical standards of conduct as well as applicable state and federal laws.
- The ability to provide effective written, oral and nonverbal communication with patients and their families, colleagues, healthcare providers and the public.
- The ability to successfully complete all requirements needed to receive Advanced Cardiac Life Support certification as defined by the American Heart Association.

An individual who poses a direct threat to the health or safety of others or themselves may be denied admission, progression or graduation. The University's determination that a person poses a direct threat will be based on an individualized assessment that relies on current medical evidence or on the best available evidence to assess the nature, duration and severity of the risk and the probability that potential injury will actually occur.

In order to fulfill the requirements of the respiratory therapist program at Millersville University, students must be able to meet the physical demands associated with the profession. For specific performance standards associated with the respiratory therapist program, please contact the program director at 717-291-8457, or consult the respiratory therapy website at www.millersville.edu/rtp.

Because of the unique responsibilities involved, the program reserves the right to require that the student who appears to be unsuited to the professional demands withdraw from the program and be guided into another curriculum of study.

BIOTECHNOLOGY

See Biology

BROADCASTING

See Communication & Theatre

BUSINESS ADMINISTRATION

College of Arts, Humanities and Social Sciences

Accounting, Finance

Professor Frazer, chairperson

Professors Guo, Galante

Associate Professors Blazer, Leinberger
Assistant Professor Dillon

Management, Marketing

Assistant Professor DiRusso, chairperson
Professors Ghoreishi, Nakhai
Associate Professors Corrigan, Douglas
Assistant Professor Hutto

The business administration program is nationally accredited by the Association of Collegiate Business Schools and Programs to offer the Bachelor of Science (B.S.) in business administration, with options in accounting, finance, international business, management and marketing. The curriculum is designed to provide study in the subjects required for employment in any business or organization. The business administration program has a diverse faculty with extensive academic training and business experience.

The curriculum also provides excellent preparation for graduate and professional studies leading to degrees such as the M.B.A., M.S., Ph.D. and the J.D. Accounting students have available all the necessary coursework to sit for either the CPA or CMA, CIA, or the CFE examination.

The curriculum is flexible enough to permit internships and cooperative education with local industry. Minor study can also be incorporated. Studies in disciplines outside business are required to help develop the well-rounded and liberally educated person employers seek.

Admission into the Bachelor of Science program from other departments of the University is limited to those who have earned at least 30 credits. Those interested should apply to the appropriate chairperson. Transfers from other institutions should check with the Office of Admissions for current grade point average requirements. The department offers minors in general business, accounting, finance, management and marketing. Please see the appropriate chairperson for an application.

COURSE REQUIREMENTS

Business Administration Major (B.S.): 120 s.h.

Curriculum requirements include 33 credits of courses in the business core; 15-16 credits in required related nonbusiness support courses; 15 credits in a professional option other than accounting, or 21 credits in the accounting option; and 9 credits in business or approved nonbusiness electives or in an approved minor.

Foundations Block:

Students wishing to major in business administration must complete each of the following courses with a grade of C- or higher and maintain a GPA of 2.0 or higher in the Foundations Block prior to enrolling in any other courses within the business administration program: ECON 101, ECON 102, BUAD 161, BUAD 162 and BUAD 202.

Business Core

General Business: BUAD 202, 206, 307, 358.

Accounting: BUAD 161, 162.

Finance: BUAD 341.

Management: BUAD 251, 352, 455.

Marketing: BUAD 231.

Required Related Nonbusiness Support Courses

Economics: ECON 101, 102.

Math: MATH 151 or 161 or 163; and MATH 235.

English: ENGL 316.

Professional Option Areas

(One of the following 5 options is required.)

Accounting: BUAD 361, 362, 364, 366, 461, 488 and 3 credits in accounting.

Finance: BUAD 342, 447 and 9 credits in finance.

International Business: BUAD 321; 9 credits from BUAD 344, 357, 435, ECON 325; 3 credits from ANTH 121, GOVT 251, GOVT 351, GEOG 222, ECON 206 or any BUAD course.

Management: BUAD 357, 452, 488 and 6 credits in management.

Marketing: BUAD 431, 488 and 9 credits in marketing.

Business Administration Minor: 18 s.h.

(Not available to business administration majors.)

BUAD 101 and five courses from one of the following option areas:

General Business: BUAD 161, 162, 251, 231, 341.

Accounting: BUAD 161, 162, 361, 364, 366.

Finance: BUAD 161, 162, 341, 342, and either 345 or 445.

Management: BUAD 251 and 12 credits in management.

Marketing: BUAD 231, 431, 436 and 6 credits in marketing.

NOTE: Some of these courses have prerequisites.

COURSE DESCRIPTIONS

General Business

BUAD 101: 3 s.h.

Introduction to Business (G3)

Introduction of basic business concepts such as institutional setting, organizational structures, decision making, accounting, finance, labor relations, management, marketing and government-business relations. No credit for BUAD majors, except as departmental elective if taken before becoming a BUAD major. Offered spring, fall.

BUAD 202: 3 s.h.

The Legal Environment of Business (G3)

The American legal system and its impact on business. Includes the court system, litigation and alternative dispute resolution, contract law, torts in the business environment, product and service liability, property and criminal law. Offered fall, spring.

BUAD 206 (306): 3 s.h.

Business Research Methods

The theory and practice of a number of widely used research techniques as an aid to decision making. Business application will be emphasized with cases and problems from the areas of management, marketing, finance and accounting. Uses computer programs for data analysis, interpretation and presentation of research results. Offered fall, spring. Prereq: MATH 151 or 161 and MATH 235.

BUAD 300: variable credit, 3 s.h. minimum

Cooperative Education in Business Administration

BUAD 302: 3 s.h.

Law of Business Organizations and Transactions

Continuation of BUAD 202. Includes such topics as consumer law, debtor-creditor law, secured transactions, bankruptcy, forms of business organization, securities regulation, antitrust, labor-management relations, employment discrimination, environmental law, international business, wills and trusts. Recommended for students studying for the CPA exam, or for business students who wish to broaden their knowledge of the legal environment of business. Counts as a business administration departmental elective, or as an accounting elective in the accounting option. Offered annually. Prereq: BUAD 202.

BUAD 310: 3 s.h.

The Economics of Justice (P, D)

Economic concepts and models used to explain legal principles. The effects of legal decision making on economic efficiency. Topics include property, contracts, torts and criminal law. Offered annually. Prereq: BUAD 202, ECON 102, COMM 100, ENGL 110, junior status.

BUAD 321 (201): 3 s.h.

Introduction to International Business (G3)

A survey of international business (IB). Introduces major issues, institutions, opportunities, problems and managerial processes unique to international business. Includes micro and macro context, theory, impact of environmental factors on international business operations, and identification and analysis of managerial issues. Course content relates to current events. Offered fall, spring. Prereq: ECON 101, 102.

BUAD 400: variable credit, 3 s.h. minimum

Cooperative Education in Business Administration

BUAD 405: 3 s.h.

Special Topics in Business Administration

Advanced, innovative or exploratory topics and disciplines within business administration. Specific content items developed by instructor. Most topics will be for business majors only. Offered periodically. Prerequisites may vary. Consult the current course offering.

BUAD 488: 3 s.h.

Seminar in Business Administration (W)

Research on a topic, including preparation and critical analysis of a paper. Topic need not be from student's option. Offered fall, spring. Prereq: ENGL 110 and senior status. Prerequisites will vary.

BUAD 498: variable credit

Independent Study in Business Administration

For the definition of independent study and eligibility, refer to the *Academic Policies* section of this catalog.

Accounting

BUAD 161: 3 s.h.

Introduction to Financial Accounting

Examination of the account cycle and systems and procedures for developing financial information; introduction to the conceptual and theoretical foundation of financial information systems; and interpretation of financial statements. Offered fall, spring. Prereq: MATH 101 or MATH placement beyond MATH 101 (MATH 151, 155H, 160, 161, 163H).

BUAD 162: 3 s.h.

Introduction to Managerial Accounting

Problem-oriented introduction to the interpretation and application of accounting information from the viewpoint of management, with emphasis on planning and control and long-range strategies. Offered fall, spring. Prereq: C- or higher in BUAD 161.

BUAD 361: 3 s.h.**Intermediate Accounting I**

Financial statement preparation with special attention to revenue recognition and asset valuation. Emphasis on generally accepted accounting principles and accounting theory. Students will develop a familiarity with the official pronouncements. Offered fall, spring. Prereq: C- or higher in BUAD 162.

BUAD 362: 3 s.h.**Intermediate Accounting II**

Examination of generally accepted accounting principles as they apply to long-term liabilities and equity. This course is a continuation of Intermediate Accounting I. Includes issues of current interest. Selected readings from pronouncements. Offered fall, spring. Prereq: C- or higher in BUAD 341, 361.

BUAD 363: 3 s.h.**Accounting Information Systems**

Special emphasis on current problems and issues using small business accounting software. Offered infrequently. Prereq: C- or higher in BUAD 361.

BUAD 364: 3 s.h.**Cost Accounting**

Investigates cost-accounting techniques such as budgeting, accounting controls, standard cost, operation evaluation techniques, variance analysis and performance analysis. The role of cost accounting in profit planning and decision making is examined. Offered fall, spring. Prereq: C- or higher in BUAD 162, 206(306).

BUAD 365: 3 s.h.**Not-for-Profit Accounting**

A review of fund accounting, application of fund accounting to nonprofit organizations such as state and local governments and healthcare institutions. Offered infrequently. Prereq: BUAD 161.

BUAD 366: 3 s.h.**Federal Income Tax I**

Study of federal income tax laws as they relate to individuals and businesses. Topics include gross income, deductions, basis, gains and losses, and tax computations. Students are introduced to tax research techniques and applications. Offered fall, spring. Prereq: C- or higher in both BUAD 162 and 202.

BUAD 367: 3 s.h.**Federal Income Tax II**

Study of corporate, S corporation and partnership taxation. Topics include corporate organization, distribution, reorganization, accumulated earnings, S elections, partnership formation, operation and transfers. Introduction to estate planning and wealth accumulation. Counts as a business administration departmental elective, or as an accounting elective in the accounting option. Offered annually. Prereq: BUAD 366.

BUAD 461: 3 s.h.**Auditing**

Study of the attest function of the independent auditor and review of theory and procedures for evaluating internal control and financial information. Includes generally accepted auditing standards as developed and applied to different audit areas in order to establish the fairness of financial information. Offered fall, spring. Prereq: C- or higher in BUAD 361.

BUAD 465: 3 s.h.**Advanced Accounting**

Accounting formation, operation and liquidation of the partnership and corporate forms of business. Emphasis on preparing consolidated financial statements. Review of topics such as nonprofit accounting and multinational business. Offered periodically. Prereq: BUAD 362.

BUAD 561: 3 s.h.**Auditing (See BUAD 461)***Finance***BUAD 143: 3 s.h.****Personal Financial Planning**

Theoretical tools of economics and business management are applied to personal financial planning and management. Topics include financial planning, consumer credit, budgeting, insurance, retirement and estate planning. Offered infrequently. Does not count in any business administration option, but can count as BUAD elective.

BUAD 341: 3 s.h.**Managerial Finance I (W)**

Fundamental topics in corporate finance, including use of financial statements, time value of money, capital budgeting and working capital management. Offered fall, spring. Prereq: ECON 102, C- or higher in BUAD 162, and ENGL 110.

BUAD 342: 3 s.h.**Managerial Finance II**

Advanced topics in corporate finance, including risk analysis of operating and financial decisions, capital budgeting and cash-flow analysis. Offered fall. Prereq: C- or higher in BUAD 341, MATH 235, and BUAD 206(306) or ECON 332 or ECON 333.

BUAD 343: 3 s.h.**Real Estate Fundamentals**

Introduces special characteristics of real estate and how real estate decisions are made. Includes real estate terms, laws, commercial and residential markets, and property valuation. Offered infrequently. Prereq: C- or higher in BUAD 341.

BUAD 344: 3 s.h.

International Finance

The international financial environment and a comprehensive analysis of foreign exchange rates and instruments. Topics include the international monetary system, balance of payments, contemporary currency trading and quotation, forward contracts, international parity conditions and foreign currency options. Offered annually. Prereq: C- or higher in BUAD 341.

BUAD 345: 3 s.h.

Investment Analysis

Analysis of investment objectives and functioning of capital markets, including market trading strategies and techniques of portfolio management. Study of stocks and bonds, mutual funds, options and futures. Offered fall. Prereq: C- or higher in BUAD 341.

BUAD 346: 3 s.h.

Principles of Bank Administration

Bank investment practices, liquidity management, deposits acquisition and administration, branch location decisions, optimal bank capital, mathematical model in banking, management science in banking, computers and checkless banking. Offered infrequently. Prereq: C- or higher in BUAD 341.

BUAD 347: 3 s.h.

Risk and Insurance

Introduces principles and mechanics of insurance. Includes the conceptual and historical framework of insurance and the actual mechanics of insurance risk management as they pertain to personal and business needs. Offered infrequently. Prereq: C- or higher in BUAD 341.

BUAD 445: 3 s.h.

Financial Markets

Classical and modern thought on markets. Numerous modern markets are investigated in terms of functionality, strategy and development. Offered annually. Prereq: ECON 101, BUAD 341.

BUAD 447: 3 s.h.

Cases in Finance (W)

Continuation of the study of financial theory and its application using the case method. Real-world financial problems for which elementary or traditional analysis may be deficient. Emphasizes the interrelationship of finance to other areas of study (such as marketing, personnel). Offered spring. Prereq: C- or higher in BUAD 342 and ENGL 110.

Management

BUAD 251: 3 s.h.

Principles of Management (G3, W)

Examines management processes of planning, organizing, leading and controlling, and provides basic knowledge of management history, managers' roles and functions, environmental influences, effective decision making, leadership and team management, ethical and social responsibilities, and current trends in management. Offered fall, spring. Prereq: ECON 101, 102 and ENGL 110.

BUAD 307(207): 3 s.h.

Management Information Systems

Technology, application and management of computer-based management information systems. Covers identification of the need for management information, the assignment of resources and establishment of an information system. Includes case studies. Offered fall, spring. Prereq: BUAD 162.

BUAD 351: 3 s.h.

Organization Theory

Introduction of the perspective of business as a system dedicated to the reduction of uncertainties. Topics include leadership, styles of management, the management of conflict, group behavior, politics, power and the understanding of the importance of knowledge related to the external environment. Offered periodically. Prereq: C- or higher in BUAD 251.

BUAD 352: 3 s.h.

Human Resource Management

Survey course familiarizes students with the human resource function. Topics include recruitment, orientation, training, compensation, safety, performance evaluation and labor relations. Offered fall, spring. Prereq: C- or higher in BUAD 251.

BUAD 353: 3 s.h.

Labor-Management Relations

Course covers roles of management and labor unions using an analytical framework for labor-relations problems, contract negotiations and administration. Offered periodically. Prereq: C- or higher in BUAD 251.

BUAD 354: 3 s.h.

Compensation Management

Specific focus on methods for determining wages. Salaries, incentive payments, point classification and factor comparison systems are discussed in detail. Management of benefits, including hospitalization, major medical, life insurance, long-term disability and pension administration, is emphasized. Offered periodically. Prereq: BUAD 352.

BUAD 355: 3 s.h.

Business and Society (G3)

Relationships between economic decision makers (business) and the various interests affected by their decisions (society). Emphasis on the ethical dimensions of decision making in business. Specific issues include cultural relativism, social and economic justice, private property and the choice of an economic system, corporate social responsibility, acceptable risks for consumers, acceptable risks to the environment, affirmative

action and reverse discrimination, sexual harassment and comparable worth, disclosing and concealing information in sales, insider trading and whistleblowing. Offered periodically.

BUAD 356: 3 s.h.

Entrepreneurial Management

Managing a new venture while continually juggling vital issues such as mission and values statement; goals and objectives; growth strategy; people and resources; organizational capabilities; financing strategy; vision of success. The course addresses differences between entrepreneurial management and corporate management. Offered periodically. Prereq: BUAD 231 and C- or higher in BUAD 251.

BUAD 357: 3 s.h.

International Management (G3)

Examination of management challenges associated with developing strategies and managing operations of firms whose activities extend across national boundaries. Theoretical, institutional and case analysis of major issues, including the impact of international codes and organizations on corporate policies, the effect of government policies, techniques for assessing foreign environments, and strategies for managing international business operations, are covered. Offered fall, spring. Prereq: BUAD 251 (C- or higher).

BUAD 358: 3 s.h.

Management Science

An introduction to management science techniques in order to facilitate quantitative reasoning as an aid for managerial decision making. Emphasis on developing analytical skills. Decision-making cases and problems presented with the aid of computers. Topics include linear programming (including modeling, computer solution and sensitivity analysis), assignment/transportation/transshipment problems, project management techniques (PERT/CPM), queuing models, simulation, inventory control models, decision theory, analytic hierarchy process (AHP) and Markov processes. Offered fall, spring. Prereq: MATH 151 or 161 or 163 and 235, and BUAD 206(306).

BUAD 375: 3 s.h.

Business Web Development

Prepares individuals to plan, manage, supervise and market electronic business operations, products and services provided online via the Internet. Builds skills to develop a modern business website using technologies such as HTML, CSS and JavaScript. Includes coverage of web client-server architecture, security, performance issues, monetization, website promotion, database integration through server-side scripting and commercial deployment. The course supports entrepreneurial and small business operations. Offered periodically. Prereq: BUAD 307.

BUAD 381: 3 s.h.

Data Information Management

Builds on the core concepts of data and information management. It is centered around the core skills of identifying organizational information requirements, modeling them using conceptual data modeling techniques, converting the conceptual data models into relational data models and verifying its structural characteristics with normalization techniques, and implementing and utilizing a relational database using an industrial-strength database management system. The course will also include coverage of basic database administration tasks. In addition to developing database applications, the course helps the students understand how large-scale packaged systems are highly dependent on the use of DBMSs. Building on the transactional database understanding, the course also provides an introduction to data and information management technologies that provide decision support capabilities under the broad business intelligence umbrella. Offered periodically. Prereq: BUAD 307.

BUAD 452: 3 s.h.

Operations and Supply Chain Management

Survey of basic principles, concepts and techniques of operations management applicable to manufacturing as well as service organizations. Examines positioning, design and operating decisions and their interrelationships in the context of the overall competitive strategy of the firm. Explores current trends and innovations in operations management theory and practice. Topics include operations strategy, quality control/TQM, product/service design, capacity planning, process design, facility layout, design of work systems, location planning, supply chain management, inventory control, MRP/ERP, just-in-time systems, scheduling and project management. Offered fall, spring. Prereq: C- or higher in BUAD 251 and MATH 151 or 160 or 161 or 163, and MATH 235 or MATH 130.

BUAD 453: 3 s.h.

Supply Chain Logistics Management

Study of the forward and reverse logistics supply chain management and arising globalization and sustainability challenges. Topics include strategic design of supply chain; management and control of flow and storage of products, services and information from suppliers to consumers; and effective management of the reverse flow of returns, buybacks and end-of-life products to recapture value through refurbishing, remanufacturing, recycling or proper disposal. Identification and analysis of emerging managerial issues in meeting complex mandated and competitive requirements of lean and green logistics systems. Offered periodically. Prereq: MATH 235 and BUAD 231 (C- or higher) or BUAD 251 (C- or higher).

BUAD 455: 3 s.h.

Strategy and Policy (W)

Theory and practice of modern strategic management. Includes strategy formulation, planning, decision techniques, organizational design to implement change, and control systems to monitor change. Offered fall, spring. Prereq: BUAD 202, 206, 307, 231, 358, 341, 352 and ENGL 110.

Marketing

BUAD 231: 3 s.h.

Principles of Marketing

Explores the role of marketing in the free enterprise system. Defines marketing and its relationship to society. Reviews the controllable elements of the marketing mix: product, place, promotion and price. Explains marketing concepts and terminology. Applies terminology and concepts to real-world problems. Covers basic analytic skills needed to solve marketing problems. Offered fall, spring. Prereq: BUAD 161, ECON 101, 102.

BUAD 332: 3 s.h.

Consumer Behavior

Analysis of individual and collective consumer behavior patterns both within and outside the marketplace through theoretical model building and empirical research findings. Emphasis on the role of consumer research in identifying, planning, implementing and evaluating both short-term and long-term marketing strategies. Offered periodically. Prereq: C- or higher in BUAD 231.

BUAD 333: 3 s.h.

Personal Selling

Covers skills and knowledge required of sales representatives to understand customers' needs and make effective presentations. Includes prospecting and contacting customers, making presentations, handling objections, closing the sale and developing long-term relationships. Emphasis on individual role-play and group presentations. Offered periodically. Prereq: C- or higher in BUAD 231.

BUAD 335: 3 s.h.

Advertising

Economic and social roles of advertising in a contemporary business setting. Emphasis on the creation, development, implementation and evaluation of advertising campaigns through the analysis of creative processes, managerial techniques, media resources, budgeting methods and the concept of social responsibility. Offered periodically. Prereq: C- or higher in BUAD 231.

BUAD 336: 3 s.h.

Retail Marketing

The role of retail institutions in the marketing system. Emphasis on strategy development in the retailing context. Offered periodically. Prereq: C- or higher in BUAD 231.

BUAD 337: 3 s.h.

Sales Force Administration

Planning, direction and control of the sales force. Includes recruiting, selecting, training, supervising, compensating, motivating and evaluating sales representatives. Emphasis on acquisition of basic sales and managerial skills. Offered periodically. Prereq: C- or higher in BUAD 231.

BUAD 431: 3 s.h.

Marketing Research

Research theory and techniques used in marketing activities. Stresses formulation of research objectives, instrument design, sample selection, data collection, statistical analysis, computer applications and report writing for managerial use. Offered fall, spring. Prereq: MATH 235, C- or higher in BUAD 231.

BUAD 435: 3 s.h.

International Marketing

The development of marketing strategy for entering and competing with businesses in foreign countries. Uniqueness of foreign markets and their impact on the marketing manager's decision-making processes are examined. Offered annually. Prereq: C- or higher in BUAD 231.

BUAD 436: 3 s.h.

Marketing Strategy

Analysis of opportunities and problems confronting the marketing manager in decision making. Includes market segmentation, target marketing, positioning, market research, product life-cycle strategies, marketing-mix implementation and social responsibility. Emphasis on case analysis to bridge the gap between marketing theory and application. Offered annually. Prereq: BUAD 431 and 90 credits.

CHEMISTRY

College of Science and Technology

Professor Rajaseelan, chairperson

Professors Mbindyo, Rickard

Associate Professors Miller, Schiza

Assistant Professors Allen, Bonser, Eliooff, Kennedy, Kittleman

The Department of Chemistry, approved by the American Chemical Society (ACS), offers three degree programs leading to the baccalaureate degree with a major in chemistry. The recommended course sequence during the first year is identical for the three programs and thereafter differs only slightly through the junior year; thus a change in career emphasis in chemistry need not delay graduation.

The Bachelor of Science degree (B.S.) offers intensive training in chemistry and mathematics and is designed specifically for students who wish to pursue graduate studies or employment as a chemist. There are four options available within the B.S. degree program. The first option, in biochemistry, provides study in the chemistry of life processes. This program offers the best preparation for acceptance to medical schools. Completion of the requirements for these degree programs leads to certification of the graduate by the department to the American Chemical Society, which offers immediate membership eligibility in the ACS as well as more desirable employment opportunities. The second option, in environmental chemistry, provides study in areas that involve the traditional chemistry of the atmosphere, hydrosphere, geosphere and biosphere. The third option is in polymer chemistry. Polymer chemistry forms the basis for the production of plastics, synthetic fibers, paints, coatings, adhesives and many other chemical products.

The fourth option, in nanotechnology, provides study in the control of materials at very small dimensions to make smaller, cheaper and better materials used in many fields. Students spend a semester at the Penn State University Park campus in their nanofabrication facility. Graduates can pursue graduate studies in materials science.

The Bachelor of Arts degree (B.A.) is a more versatile program, combining a solid foundation in chemistry with an ample opportunity for breadth of study. Students electing this degree have found it to be sound preparation for further study or a career in chemistry. It invites interdisciplinary studies in areas such as environmental science, geochemistry, oceanography and chemical physics, and provides the breadth and depth of pre-professional training necessary for subsequent study in, for example, law or medicine.

For those students desirous of pursuing a career in high school teaching, the Bachelor of Science in Education degree (B.S.Ed.) provides a sound background in chemistry as well as the necessary methods courses.

An important program option in chemistry is an internship. Applicable to any of the above degree options, internships offer students invaluable experience in a job related to their career goal as well as financial remuneration, which helps significantly to defray the expenses of college study. Beginning after the freshman year, students choosing this option may alternate periods of on-campus study with off-campus employment until graduation. In addition, up to three credits may be approved to count toward major sequence requirements for each internship experience, and up to six credits may be counted toward degree requirements. For more information, see *Cooperative Education* in the *Special Academic Opportunities* section.

The chemistry 3+4 Pre-pharmacy option within the B.S. program requires three years of study as a chemistry major in the Millersville University liberal arts curriculum, with one year in the Lake Erie College of Osteopathic Medicine (LECOM) Pharmacy school program. At the end of the four years, the student receives a B.S. in chemistry degree from Millersville and after seven years, the student receives a Doctorate in Pharmacy degree from LECOM.

COURSE REQUIREMENTS

Chemistry Major (B.S.): 120 s.h.

47 s.h. in chemistry: CHEM 111, 112, 188, 231, 232, 251, 265, 326, 341, 342, 391, 392, 452, 465, 487, 488, 498 (1), plus 8-10 s.h. from CHEM 312, 324, 327, 328, 375, 381, 435, 476, 482, 486, 489, 498, 499; COOP 300, 400. Required related courses: MATH 161, 211, 311 and PHYS 231, 232, plus one course in computer science, mathematics and/or physics. Students opting for ACS certification should take all chemistry courses in the given sequence in the college catalog and successfully complete Physical Chemistry II (CHEM 342) before beginning either Inorganic Chemistry (CHEM 452) or Analytical Chemistry (CHEM 465).

It is strongly recommended that students pursuing the Bachelor of Science degree achieve competency equivalent to the first two courses in a foreign language. A course in economics is also recommended.

Chemistry Major (B.S.): 120 s.h.

Biochemistry Option

47 s.h. in chemistry: CHEM 111, 112, 188, 231, 232, 251, 265, 326, 327, 328, 341, 342, 465, 487, 488, 498 (1), plus 5 s.h. selected from CHEM 312, 324, 375, 381, 391, 392*, 435, 452, 476, 482, 486, 489, 498, 499; COOP 300, 400. Required related courses: competency equivalent to BIOL 100, plus BIOL 364 and one of BIOL 362, 461, 462; MATH 161, 211, 311 and PHYS 231, 232.

*This elective must be completed to gain ACS certification in biochemistry.

It is strongly recommended that students pursuing the Bachelor of Science degree achieve competency equivalent to the first two courses in a foreign language. A course in economics is also recommended.

Chemistry Major (B.S.): 120 s.h.

Environmental Option

46 s.h. in chemistry: CHEM 111, 112, 188, 231, 232, 251, 265, 341, 342, 375, 465, 476, 487, 488, 498 (1), plus 4 s.h. minimum selected from CHEM 312, 324, 326, 327, 328, 381, 391, 392, 435, 452, 486, 489, 498, 499; COOP 300, 400. Required related courses: competency equivalent to BIOL 100, plus MATH 161, 211, 311 and PHYS 231, 232. Additional electives (9–10 s.h.) selected from BIOL 241; ESCI 245, 349, 426; GEOG 202; OSEH 321.

Chemistry Major (B.S.): 120 s.h.

Nanotechnology Option

37 s.h. in chemistry: CHEM 111, 112, 188, 231, 232, 251, 265, 312, 341, 342, 487, 488, 498, plus 4 s.h. selected from CHEM 300, 326, 375, 381, 391, 392, 435, 452, 465, 486, 489, 498 or 499. Required related courses: MATH 161, 211, 311; PHYS 231, 232; Professional block at Penn State (18 s.h.).

Chemistry Major (B.S.): 120 s.h.

Polymer Chemistry

48 s.h. in chemistry: CHEM 111, 112, 188, 231, 232, 251, 265, 341, 342, 381, 452, 465, 482, 487, 488, 498 (1), plus 11 s.h. minimum selected from CHEM 312, 324, 326, 327, 328, 375, 391, 392, 435, 476, 486, 489, 498, 499; COOP 300, 400; ITEC 271, 375. Required related courses: MATH 161, 211, 311 and PHYS 231, 232.

Chemistry Major (B.A.): 120 s.h.

37 s.h. in chemistry: CHEM 111, 112, 188, 231, 232, 251, 265, 341, 342, 391, 487, 488, plus 3 s.h. minimum selected from CHEM 326, 327, 375, 381, 392, 435, 452, 465, 486, 489, 498, 499; COOP 300, 400. Required related courses: MATH 161, 211, 311; PHYS 231, 232; competency equivalent to the first two courses in a foreign language.

Chemistry Major (B.S.): 120 s.h.

3+4 Pre-Pharmacy Option

37 s.h. in chemistry: CHEM 111, 112, 231, 232, 251, 265, 341, 342, 487, 488, 498, plus 4 s.h. minimum selected from CHEM 375, 381, 391, 392, 435, 452, 465, 486, 489, 498, 499; COOP 300. Required related courses: MATH 161, 211, 311, 235; PHYS 231, 232 and BIOL 100. Specific pharmacy curricula have additional requirements; students should consult with their advisor or chemistry department chairperson.

Chemistry Major (B.S.Ed.): 128 s.h.

Certification in Secondary Education

41 s.h. in chemistry: CHEM 111, 112, 188, 231, 232, 251, 265, 326, 341, 342, 375, 487, 488. Required related courses: competency equivalent to BIOL 100; MATH 161, 211, 311; and PHYS 231, 232. Professional education courses (27 s.h.): EDFN 211, 241 and 330; EDSE 321, 435 and 461. Refer to *Admission to Advanced Professional Studies and Certification (Education Majors)* in this catalog for more information.

It is strongly recommended that students pursuing any of the degrees in chemistry elect an appropriate course in computer science.

Chemistry majors are required to have a grade of C (2.0 quality points) or higher in chemistry courses required for the major at the 100 and 200

level before proceeding to a course for which it is a prerequisite. Currently, these courses include CHEM 111, 112, 231, 232, 251 and 265.

Chemistry Minor: 20 s.h.

20 s.h. in chemistry: CHEM 111, 112, 265; and CHEM 231 and 232, or CHEM 341 and 342, or CHEM 235 plus one elective from CHEM 326, 375.

Biochemistry Minor: 25 s.h.

25 s.h. in chemistry: CHEM 111, 112, 231, 232, 326, 324 or 327, 328.

Environmental Chemistry Minor: 20-24 s.h.

Required courses: CHEM 111, 112, 375, 476 and CHEM 231, 232 or 235. Recommended courses: CHEM 265.

COURSE DESCRIPTIONS

CHEM 101: 3 s.h.

Chemistry! Better Things for Better Living (G2)

A brief introduction to chemistry and its uses in modern society: consumer, environmental and industrial application. Presented in a mostly descriptive fashion. No credit toward chemistry major. 3 hrs. lec. Offered fall, spring.

CHEM 102: 3 s.h.

Demonstration Chemistry (G2, L)

Chemical reactions that are encountered in everyday living, present in living systems, the basis of societal issues, the foundation of producing new materials and used to modify materials into finished products. Investigated by observing, describing, explaining and presenting demonstrations. Emphasis on readily understood reactions that begin with and produce nonhazardous materials. No credit toward chemistry major. 2 hrs. lec., 2 hrs. lab. Offered infrequently.

CHEM 103: 3 s.h.

General, Organic and Biochemistry I (G2, L)

An introduction to the basic theories of general and organic chemistry, including nomenclature, reactions and problem solving. Appropriate for nonscience majors and satisfies general education requirements. Proficiency in algebra is essential. High school chemistry is required. 2 hrs. lec., 2 hrs. lab. Offered fall, summer.

CHEM 104: 3 s.h.

General, Organic and Biochemistry II (G2, L)

Solutions, acids and bases, oxidation reduction and organic chemistry, including nomenclature and basic reactions with relevancy to biochemistry. Appropriate for nonscience majors and satisfies general education requirements. 2 hrs. lec., 2 hrs. lab. Offered spring. Prereq: CHEM 103.

CHEM 110: 3 s.h.

Fundamentals of Chemistry

An intensive review of the fundamentals of chemistry, with particular emphasis placed on solving chemistry problems. Topics include measurements, formulas and nomenclature, equations, stoichiometry, atomic and molecular structure, solution concentrations, acids and bases. This course is designed to prepare students majoring in the sciences for their general chemistry sequence, CHEM 111 and CHEM 112. This course may be counted only as an elective beyond normal graduation requirements. 3 hrs. lec./problem solving. Offered fall, summer. Prereq or Coreq: MATH 101 or MPT of 160 or higher.

CHEM 111: 4 s.h.

Introductory Chemistry I (G2, L)

The properties and theories of the solid, liquid and gaseous states of matter, the stoichiometry and thermochemistry of chemical reactions, and theories and applications of molecular structure and bonding. Proficiency in algebra is essential. High school chemistry is strongly recommended. Intended for science majors: biology, chemistry, earth sciences, physics. 3 hrs. lec., 1 hr. discussion, 2 hrs. lab. Prereq: CPT of CHEM 111 or CHEM 110 with a grade of C- or higher; and MPT of MATH 160 or higher or MATH 101 with a grade of C- or higher; or permission of instructor.

CHEM 112: 4 s.h.

Introductory Chemistry II (G2, L)

Continuation of CHEM 111. The interactions of matter and energy thermodynamics, kinetics and electrochemistry. Equilibria in aqueous systems theory and practice. Coordination chemistry and descriptive chemistry of the elements. 3 hrs. lec., 1 hr. discussion, 2 hrs. lab. Prereq: CHEM 111 with a grade of C- or higher; C for chemistry majors.

CHEM 113H: 1 s.h.

Honors Seminar for Introductory Chemistry

The ideas of introductory chemistry are studied in extended depth, using problems, laboratory exercises, readings and discussion. Grades of B- or higher in both CHEM 112 and CHEM 113 will result in honors designation for the pair. The pair of courses counts as one entry in the science component of general education and results in 5 hours of general education credit. 1 hr. discussion. Offered spring. Prereq or Coreq: CHEM 112 is required.

CHEM 188: 1 s.h.

Freshman Seminar in Chemistry

An orientation to the opportunities and services available to chemistry students in the university and professional environments. Students will develop a better understanding of the major and career options and will be introduced to the chemistry department faculty and programs. 1 hr. discussion. Required of all freshman chemistry majors. Recommended for transfer students. Offered fall.

CHEM 205: 4 s.h.

The Molecular Basis of Color and Form-Chemistry in Art (G2, L)

Artists and chemists are both interested in the topics of color and form. In this course, color and form will provide the focus for students to investigate, through a variety of lecture, laboratory and studio activities, the scientific basis of such topics as paints, clays and glazes, metalworking, photography, dyes and fabrics, polymeric materials, art preservation and restoration, and chemical hazards in art. Knowledge of high school chemistry or equivalent is assumed. 3 hrs. lec., 3 hrs. lab. Offered infrequently.

CHEM 231: 4 s.h.**Organic Chemistry I (G2, L)**

Organic structural theory, including conformations and configurations of molecules and functional group classification of organic compounds-alkanes, alkenes, alcohols, ethers, alkyl halides, aldehydes and ketones, and aromatic and organometallic compounds. Major emphasis on relationships among molecular structure, chemical reactivity and physical properties. Thorough integration of reaction mechanisms as elucidated using principles of kinetics, thermodynamics, stereochemistry and spectroscopy. Introduction to the instrumentation of organic chemistry: proton and carbon-13 NMR, infrared and mass spectrometry. 3 hrs. lec., 3 hrs. lab. Prereq: CHEM 112 with a grade of C- or higher; C for chemistry majors.

CHEM 232: 4 s.h.**Organic Chemistry II (G2, L)**

The structure-property-reactivity-mechanism-synthesis approach from CHEM 231 continues with application to, and/or emphasis on, unsaturated compounds-alkynes, dienes and aromatic compounds. Also, carbonyl compounds, including carboxylic acids and derivatives, along with amines, phenols and complex compounds with multiple functionality. Introduction to natural and synthetic polymers; biomolecules, including fats, oils, amino acids and carbohydrates, along with the basic reactions of metabolism. Thorough integration of structural relationships to spectral properties using UV, IR, C-13 and H-1 NMR, and mass spectral instrumentation and derived data. 3 hrs. lec., 3 hrs. lab. Prereq: CHEM 231 with a grade of C- or higher.

CHEM 235: 4 s.h.**Short Course in Organic Chemistry**

The elementary theory, reactions and properties of organic compounds in an integrated fashion. No credit toward chemistry major. 3 hrs. lec., 3 hrs. lab. Offered fall. Prereq: CHEM 112 with a grade of C- or higher; C for chemistry majors. CHEM 235 is not an acceptable Prereq for CHEM 232.

CHEM 251: 3 s.h.**Inorganic Chemistry I**

Emphasis on the unification of descriptive chemistry with the basic principles that may be used to explain natural phenomena in inorganic chemistry. The physical and chemical properties of the elements and classes of compounds such as oxides, halides, hydrides, etc., will be described and explained. Acid-base and oxidation-reduction behavior will be emphasized, along with coordination chemistry. Periodic trends are an integral part of the course. 3 hrs. lec. Offered spring. Prereq: CHEM 112 with a grade of C- or higher; C for chemistry majors; or Coreq: CHEM 112.

CHEM 265: 4 s.h.**Quantitative Analysis (G2, L)**

An integrated study of advanced chemical equilibrium, activity, experimental uncertainty and accepted practice in the analytical laboratory. Titrimetry, potentiometry, extraction theory, introductory spectroscopy and chromatography are discussed. 3 hrs. lec., 3 hrs. lab. Offered spring, summer. Prereq: CHEM 112 with a grade of C- or higher; C for chemistry majors.

CHEM 312 (302): 3 s.h.**Chemistry in Nanotechnology**

A study of principles, methods and applications of chemistry in nanotechnology, with a special emphasis on the chemistry of materials. Topics include synthesis, characterization and manipulation of nanomaterials, sensors, bioinspired nanomaterials, atomic force and scanning electron microscopy. 2 hrs. lec., 3 hrs. lab. Offered spring. Prereq: NFMT 313 and CHEM 104 or 111; or CHEM 232; or CHEM 235; or permission of instructor.

CHEM 324: 4 s.h.**Plant Biochemistry**

A study of enzymes and pathways involved in plant intermediary metabolism as related to plant cell structure, function and plant development. Topics include plant bioenergetics, biosynthesis of plant hormones and elicitor molecules, signal perception and transduction, and secondary metabolites (natural products). 3 hrs. lec., 3 hrs. lab. Offered spring. Prereq: BIOL 221 and 263; CHEM 232 or 235.

CHEM 326: 4 s.h.**Biochemistry I**

The structure and physical and chemical properties of carbohydrates, lipids, nucleic acids and other biological compounds, and their importance in life processes. Introduction to metabolic processes. Laboratory studies include the properties of chemicals of biological origin, techniques in isolation, identification, qualitative and quantitative analysis. 3 hrs. lec., 3 hrs. lab. Prereq: CHEM 232 or 235, with a grade of C- or higher.

CHEM 327: 4 s.h.**Biochemistry II**

Major focus on understanding the chemistry behind the function of biological compounds involved in cellular processes. Specific topics include enzyme mechanisms and energetics, membrane dynamics and transport, replication, transcription, protein translation and signal transduction. Additionally, metabolism of lipids, amino acids and nucleotides is studied in detail. 3 hrs. lec., 3 hrs. lab. Offered spring. Prereq: CHEM 326 with a grade of C- or higher.

CHEM 328: 1 s.h.**Analytical Biochemistry Laboratory**

Laboratory course designed to expand the technical experience of biochemistry students. Experiments completed focus on the analysis of major classes of biological compounds using advanced techniques and instrumentation. Includes opportunities to develop literature research, writing and presentation skills critical for scientific study. 3 hrs. lab. Offered spring. Prereq or Coreq: CHEM 327 or CHEM 324 or BIOL 324.

CHEM 341: 4 s.h.**Physical Chemistry I (W)**

A thermodynamic study of chemical systems, including ideal and nonideal solutions, chemical and phase equilibria, and electrochemistry. Investigation of the macroscopic behavior of gases and its theoretical explanations. Summary of the determination and application of additive properties. 3 hrs. lec., 3 hrs. lab. Offered fall. Prereq: CHEM 265 with a grade of C or higher, PHYS 232, MATH 311 and ENGL 110.

CHEM 342: 4 s.h.**Physical Chemistry II (W)**

Chemical kinetics, statistical mechanics, and the development and present state of quantum theory, including chemical bonding theories, atomic and molecular spectroscopy, and methods of structure determination. 3 hrs. lec., 3 hrs. lab. Offered spring. Prereq: CHEM 341 with a grade of D

or higher and ENGL 110, or permission of instructor.

CHEM 372/372H: 3 s.h.

The History of Chemistry and Society (D, P)

The history of the development of the science of chemistry from its roots in Egyptian and Greek societies through its specialization in the early 20th century. The relationships between chemical developments and society are explored, as well as the influences of chemistry on Western thought. 3 hrs. discussion. Offered periodically. Prereq: COMM 100; ENGL 110; junior status; CHEM 102, 104 or 111; two social science courses, including one history course: HIST 101, 102 or 410 preferred.

CHEM 375: 4 s.h.

Environmental Chemistry (D, G2, L)

The application of modern chemical principles to the chemical and physical interactions among the hydrosphere, lithosphere, atmosphere and biosphere. Also discussed are the more recent topics in the areas of pollution, energy and waste control. (The laboratory covers the current, fundamental instrumental methods and techniques encountered in environmental analysis.) 3 hrs. lec., 3 hrs. lab. Offered fall. Prereq: CHEM 112 with a grade of C- or higher.

CHEM 381: 4 s.h.

Polymer Chemistry I

An introduction to polymer chemistry. Covered are nomenclature, solutions and solubility, molecular weight determination, morphology, structure determination, polymerization reactions and synthetic methods, physical properties and fabrication methods. The laboratory provides an introduction to the methods of polymer synthesis and characterization. 3 hrs. lec., 3 hrs. lab. Offered in alternate spring semesters. Prereq: C or higher in CHEM 232 or permission of instructor.

CHEM 391: 1 s.h.

Advanced Laboratory I

Application of advanced techniques in organic synthesis, including chemical and physical methods of separation, with major emphasis on advanced spectroscopic methods of characterizing organic compounds. 3 hrs. lab. Offered fall. Prereq: C or higher in CHEM 265, 232.

CHEM 392: 1 s.h.

Advanced Laboratory II

A continuation of CHEM 391, including advanced techniques in inorganic synthesis and analysis. 3 hrs. lab. Offered spring. Prereq: CHEM 251 with a grade of C or higher.

CHEM 435: 3 s.h.

Advanced Organic Chemistry

Current theories of organic chemistry, with major emphasis on physical aspects as applied to structure, reactions, spectroscopy and reaction mechanisms. 3 hrs. lec. and reading in current literature. Offered in alternate spring semesters. Prereq: C or higher in CHEM 232.

CHEM 452: 3 s.h.

Inorganic Chemistry

Theories of bonding and structure of inorganic elements and compounds, acid-base theories, coordination chemistry, organometallic chemistry, and bioinorganic chemistry. 3 hrs. lec. Offered fall. Prereq: C or higher in CHEM 251 and 342 or permission of instructor.

CHEM 465: 4 s.h.

Analytical Chemistry (W)

Theory and practice of modern analytical techniques in chemical separations and instrumental analysis. 3 hrs. lec., 3 hrs. lab. Offered spring. Prereq: ENGL 110 and Prereq or Coreq: CHEM 342.

CHEM 476: 4 s.h.

Environmental Chemistry II

Extension of the principle topics covered in CHEM 375, with emphasis on quantitative aspects of topics such as the ozone layer, potential greenhouse effects, tropospheric chemistry, chemical fate and transport in aquatic systems, phase interactions and chemical equilibrium. Includes computer modeling, government regulations, pesticides and pollutants, hazardous waste and disposal methods. All topics will be studied from chemical, political and socioeconomic perspectives. 3 hrs. lec., 3 hrs. lab. Offered alternate spring semesters. Prereq: CHEM 375.

CHEM 482: 3 s.h.

Polymer Chemistry II

Topics in polymer physical chemistry, including conformation of polymer molecules, polymer solutions, theory of molecular weight determination methods, rheology, orientation, time-temperature dependence of physical properties, thermodynamics and kinetics of polymerization, rubber elasticity and spectroscopic methods of polymer characterization. 3 hrs. lec. Offered alternate fall semesters. Prereq: CHEM 342 and 381 or permission of instructor.

CHEM 486: 1-4 s.h.

Topics in Chemistry

Detailed investigation of a topic in chemistry of current interest. Topic to be announced each time course is offered. Offered infrequently. Prereq: permission of instructor.

CHEM 487: 0.5 s.h.

Seminar in Chemistry I

Topics of current chemical interest. 1 hour. Offered fall. Prereq: senior standing or permission of instructor.

CHEM 488: 0.5 s.h.

Seminar in Chemistry II

Topics of current chemical interest. 1 hour. Offered spring. Prereq: CHEM 487; Coreq: GRAD 999 or permission of instructor.

CHEM 498: 1-3 s.h.

Introduction to Research/Independent Study in Chemistry

A course for qualified students to investigate problems in chemistry. Guidance in the methods of chemical research. A minimum of 3 hours of lab required per semester hour. Prereq: permission of instructor. For further information on independent study, see the *Special Academic Opportunities* section of this catalog.

CHEM 489, 499: 1-3 s.h.

Honors Courses/Thesis

For the definition of honors course/thesis and eligibility, refer to the *Special Academic Opportunities* section of this catalog.

CLINICAL LABORATORY SCIENCE

See Biology, Medical Technology

COMMUNICATION & THEATRE**College of Arts, Humanities and Social Sciences**

Associate Professor Russell-Loretz, chairperson
 Professors Boyle, Chang, Dorman, Seigworth
 Associate Professors Capecce, Elliot, Irwin, Schreiber, Wood
 Assistant Professors Capecce, Igyor, Spicer, Woodall
 Instructor Ellis

The Department of Communication & Theatre offers a Bachelor of Science degree in speech communication. The liberal arts program prescribes a common core of required courses and allows the choice of one of four options, including broadcasting, communication studies, public relations and theatre. Each option contains a specific group of required courses and an additional group of electives chosen in consultation with a departmental advisor.

COURSE REQUIREMENTS

Persons considering the speech communication program should consult with the department about options and requirements. These programs undergo periodic revision. A complete description of the current program and GPA requirements is available from the departmental office. Options or minor programs of study must be chosen by students with their advisor's consent.

Upon acceptance into the speech communication program, the following academic requirements must be maintained in order to graduate: a C or higher is required in each core course before taking the next higher core course; student progress in the major is reviewed no later than the semester following completion of 60 hours. Students in the major must attain a 2.5 GPA in the major in order to be retained in the major.

Required Core:

COMM 101, 201, 301 and 401.

*Communication Options***Speech Communication Major (B.S.)****Broadcasting Option**

Required courses: Core courses above, plus the following: COMM 121, 220, 320, 321, 326. Additional requirements: select 24 s.h. of electives from approved list in consultation with advisor.

Speech Communication Major (B.S.)**Communication Studies Option**

Required courses: Core courses above, plus 12 credits from the following courses: COMM 203, 217, 227, 317 or 403. Additional requirements: choose 27 credits from major courses, with a minimum of 15 credits from the Additional Requirements list. Of these 27 credits, six credits must be at the 300 level and six credits must be at the 400 level, OR a student may complete a University-approved minor and nine credits from the Additional Requirements list with at least six credits at the 300 or 400 level. The Additional Requirements list contains these courses: COMM 203, 217, 224, 225, 227, 251, 300, 317, 322, 330, 333, 342, 380, 400, 403, 429, 431, 440, 441, 450 and 461.

Speech Communication Major (B.S.)**Public Relations Option**

Required Public Relations courses: Core courses above, plus the following: COMM 121, 206, 220, 224 or 305, 251, 351, 403 or 342 or 441, 451, 452. Additional requirements: BUAD 101, ENGL 313 and one elective from COMM 380 or ENGL 317 or ITEC 356. Students are encouraged to complete either a minor or an internship.

Speech Communication Major (B.S.)**Theatre Option**

Required Theatre courses: Core courses above, plus the following: THEA 120, 130, 217, 240, 300, 340, 341, 412. Additional requirements: Choose 12 s.h. from THEA 220, 230, 312, 315, 350, 400, 412, plus 15 s.h. of electives chosen in consultation with advisor.

Theatre Minor: 18 s.h.

Required Theatre courses (12 s.h.): THEA 120 or 130, 217 or 240, 340, 341. Electives (6 s.h.): Choose one course from THEA 130, 230, 120, 220 and one course from THEA 312, 315, 350, 412.

COURSE DESCRIPTIONS

COMM 300: 3-6 s.h.
Co-op/Internship in Communication

COMM 400: 3-6 s.h.
Co-op/Internship in Communication

COMM 500: 3-6 s.h.
Co-op/Internship in Communication

Communication Studies

COMM 100/100H: 3 s.h.
Fundamentals of Speech

Required fundamentals course in general education. An introductory study of the principles of public speaking, with particular emphasis on the selection and organization of information for persuasive purposes. Satisfies competency requirement.

COMM 101: 3 s.h.
Introduction to Communication (G1)

Focuses on the role of communication in everyday life. Emphasis on how communication shapes the construction of meaning, the maintenance of community and relationships, and various means of interconnection. Offered fall, spring.

COMM 201: 3 s.h.
Theories of Communication (G1)

Focuses on the different approaches to the study of communication as a discipline. Emphasis on both historical and current scholarship in the field through diverse means of inquiry. Offered fall, spring. Prereq: COMM 100, and for communication majors, COMM 101.

COMM 203: 3 s.h.
Small Group Communication (G1, W, D)

Emphasis on the theory and practice of small group communication and problem solving. Group formation, teamwork, leadership, decision making in groups, group conflict and other concepts will be explored. A collaborative group service learning project and course activities will reinforce course concepts. Offered periodically. Prereq: ENGL 110.

COMM 217: 3 s.h.
Interpersonal Communication (G1)

Combines both theory and experiential application of interpersonal communication to provide students with a means to analyze relationships and to integrate more effective communication strategies in their lives. Offered periodically. Prereq: COMM 100.

COMM 224: 3 s.h.
Introduction to Organizational Communication

A survey of the major theoretical approaches to the field and applications to specific organizational issues. Explores the scope and history of organizational communication. Offered periodically. Prereq: COMM 201.

COMM 225: 3 s.h.
Communication in the Nonprofit Sector (G1)

Explores the design, management and functioning of nonprofit/civil society organizations, with an emphasis on communication theories and processes. Highlights practices unique to these organizations, with an emphasis on enabling students to establish, run and support them. Offered periodically. Prereq: COMM 100, ENGL 110.

COMM 227: 3 s.h.
Communication, Culture and Community (G1, W, D)

Focuses on the role of communication in understanding the questions of commitment and participation, place and identity, conflict and cohesiveness. Explores issues of race, class, gender and ethnicity across various dimensions of contemporary life, especially through study of and/or participation in community service organizations. Offered fall, spring. Prereq: COMM 100, ENGL 110, sophomore standing.

COMM 301: 3 s.h.
Communication Research (W)

A survey of research methods for the study of problems in communication. Students define a research problem, survey and critique relevant literature, and design a research strategy using various research paradigms. Majors should take this course in the junior year. Offered fall, spring. Prereq: ENGL 110, COMM 201. COMM 201 and COMM 301 may be taken concurrently. However, if COMM 301 is taken after taking COMM 201, a grade of C or higher is required in COMM 201.

COMM 317: 3 s.h.
Intercultural Communication (D, P)

Explores the possibilities of communication between and among diverse cultures. Close study of cultural codes, symbolic interaction, nonverbal behavior and contexts of intercultural contact. Develops an understanding and appreciation of human diversity and competence in intercultural communication practices. Offered periodically. Prereq: COMM 100, ENGL 110 and junior standing.

COMM 333: 3 s.h.
Gender and Communication (D)

Examines theoretical explanations for the social construction of gendered identity. Considers everyday communication practices and contexts to identify how gender, communication and culture intersect to form the complex matrix of meaning which impacts individuals and society. Offered periodically. Prereq: COMM 100, ENGL 110 and junior standing.

COMM 342: 3 s.h.**Theories of Rhetoric**

Principal figures, theories and movements in rhetoric from the classical period to the present. The relationships between rhetoric and political, social and personal decisions are explored. Offered periodically. Prereq: COMM 100.

COMM 380: 3 s.h.**Digital Media Writing (W)**

Writing and design course focusing on construction of promotional messages for digital media. Students will complete several projects, including critique of publication and web designs; planning and production of print and electronic publications; website writing and layout. Offered fall. Prereq: ENGL 110 and junior standing.

COMM 401: 3 s.h.**Critical-Cultural Studies in Communication**

Reciprocal influences of communication on culture, and culture on communication. Messages, meanings and culture are approached from several critical standpoints. Offered fall, spring. Prereq: C or higher in COMM 101, 201 and 301. C or higher in COMM 401 to count toward fulfilling graduation requirements in the major.

COMM 403: 3 s.h.**Persuasion**

Persuasive speaking from both the modern and classical points of view. Offered fall or spring. Prereq: COMM 301.

COMM 429: 3 s.h.**Special Topics in Communication Studies**

Content varies. Selected theoretical perspectives and communication issues examined in depth. Potential topics include power, ideology and discourse in communication studies; semiotics and communication studies; and qualitative research methods and communication studies. Offered periodically. Prereq: C or higher in COMM 301.

COMM 431: 3 s.h.**The Body in Communication (P)**

Focuses on the ways that bodies communicate other than verbally, and how this process of embodied communication plays an active role in our sense of belonging and difference as well as gives shape to the ongoing negotiations between culture and nature. Offered periodically. Prereq: COMM 100, ENGL 110 and junior standing.

COMM 440: Leadership and Media

An introduction to the study and practice of leadership from a media perspective. Particular focus on the relationship between communicating and leading. Examination of leadership concepts and theories in organizational, group and public contexts. Students will analyze their personal leadership styles and develop leadership communication skills through team projects and classroom exercises. Offered periodically. Prereq: junior standing.

COMM 441: 3 s.h.**Political Communication (G1, W)**

Contemporary American political rhetoric focusing on national politics. Content varies. During election years, content includes campaign rhetoric, advertising and debates. In other years, the focus is administrative rhetoric and the interaction of Congress with the president on domestic and foreign affairs. Offered periodically. Prereq: COMM 100, ENGL 110; junior status or permission of instructor.

COMM 450: 3 s.h.**Communication and Conflict Management (D, P)**

Explores the communicative processes inherent in the development and management of conflict at various social levels. Highlights the various influences on how people manage conflicts at the interpersonal, organizational and societal levels. Specific approaches to managing conflict, including mediation, negotiation and arbitration. Offered periodically. Prereq: COMM 100, ENGL 110, junior standing.

COMM 461: 3 s.h.**Health Communication (P)**

Focuses on the forms and functions of human interaction in a variety of healthcare settings, and on the ways that mediated messages promote and reinforce certain health values, beliefs, practices and products. Emphasizes the role of cultural context on the construction and interpretation of health-related messages. Offered periodically. Prereq: COMM 100, ENGL 110, junior standing.

COMM 498: 1-3 s.h.**Independent Study in Communication**

For the definition of independent study and student eligibility, refer to the *Academic Policies* section of this catalog.

*Public Relations***COMM 206: 3 s.h.****Communication and Media Law**

The legal parameters of freedom of expression under the U.S. legal system. Students explore legal and ethical issues related to media systems, organizational communication, public relations and theatre. Offered fall, spring.

COMM 251: 3 s.h.**Public Relations I: Introduction to Principles and Theory (G1)**

This first of a 4-course sequence covers the history, principles and current practices of public relations. Series must be taken sequentially. Offered fall, spring.

COMM 305: 3 s.h.**Business and Professional Communication**

Advanced principles of public speaking in a professional setting. Covers organization and adaptation of speech materials, effective presentation styles, forms of proof. Offered periodically. Prereq: COMM 100, ENGL 110 and junior status.

COMM 351: 3 s.h.**Public Relations II: Public Relations Writing (W)**

Hands-on practice in writing news releases for print and broadcast, brochure and newsletter copy, and pitching story ideas to trade editors. Offered fall, spring. Prereq: COMM 251, ENGL 110.

COMM 390: 3 s.h.**Social Media Campaigns**

This course emphasizes theory and practice in the strategic planning, writing, communication design, management and analysis of social media campaigns for mobile communications, social media and online social networking. Offered fall or spring. Prereq: ENGL 110, COMM 100, junior status (60 credits earned) and COMM 251, or permission of instructor for ENTR minors.

COMM 451: 3 s.h.**Public Relations Issues and Cases**

Analysis of various organizations' public relations problems and communicative responses. Third in a 4-course sequence. Offered fall, spring. Prereq: C or higher in COMM 301, COMM 351 or permission of instructor.

COMM 452: 3 s.h.**Public Relations Campaigns**

Hands-on practice in public relations problem solving. Involves work in student-run "agencies" to develop and implement a public relations campaign for a nonprofit organization. Capstone course in public relations. Offered fall, spring. Prereq: COMM 451.

*Broadcasting***COMM 121: 3 s.h.****Introduction to Audio and Video**

Audio and video production fundamentals, techniques and uses. Includes study of the production process and hands-on production assignments in both audio and video. Laboratory work required. Offered fall, spring.

COMM 220: 3 s.h.**Survey of the History, Structure and Social Impact of American Mass Media (G1)**

A review of mass media in America and discussion of the social, cultural and technological forces that shape them. Evaluations of media criticism. Offered fall, spring.

COMM 230: 3 s.h.**International Broadcasting (W)**

Devoted to the cross-cultural study of the world broadcasting systems as an introduction to international electronic media. The course compares the ways in which the media are organized in other countries with that of the United States of America. Offered periodically. Prereq: ENGL 110; COMM majors; INTL majors, minors; or permission of instructor.

COMM 320: 3 s.h.**Radio Production**

Theory and production of various types of audio production using basic studio equipment. Laboratory work required. Offered fall, spring. Prereq: COMM 121.

COMM 321: 3 s.h.**Television Production I**

Theory and application of various phases of studio operation and editing in television production. Laboratory work required. Offered fall, spring. Prereq: COMM 121.

COMM 322: 3 s.h.**Media Criticism**

An examination of the processes and products of various media industries, with a focus on understanding and learning to critique the ways in which the media, their texts and audiences exist within a set of increasingly complex relationships. Offered periodically. Prereq: COMM 201.

COMM 325: 3 s.h.**Broadcast News Reporting**

Style and other basics of radio and television news. Includes collecting data, writing stories, editing and producing video for campus cable TV station. Laboratory work required. Offered fall. Prereq: COMM 121 and basic typing skills.

COMM 326: 3 s.h.**Broadcast Workshop I (W)**

Basic news writing and reporting, stressing electronic media. Offered fall. Prereq: ENGL 110 or permission of instructor.

COMM 330: 3 s.h.**Media and Women's Culture (P, D)**

The course focuses on the role of the media in the creation and reproduction of culture. It examines how gender, race and class are constructed in media texts, and how women in various social and cultural positions negotiate their own meanings in relation to media portrayals. Offered periodically. Prereq: junior status, COMM 100, ENGL 110.

COMM 335: 3 s.h.**Communications and Emerging Technologies**

This course focuses on the implications, for individuals and society, of new information and communication technologies. Through extensive readings, reflections and writings, students will acquire an understanding of the role technologies have played in their lives and the impact they have in their future careers. Offered periodically. Prereq: COMM 100, ENGL 110, junior standing.

COMM 337: 3 s.h.**Documentary Filmmaking I: Concepts (D)**

Focused on the history and theory of documentary films. Through readings, screenings and discussions, students gain a historical and theoretical understanding of documentary filmmaking and become prepared for more advanced production courses. Students also explore their own documentary ideas and develop an outline and treatment. Prereq: COMM 100; ENGL 110; junior standing. Offered periodically.

COMM 421: 3 s.h.**Television Production II**

An advanced lecture-demonstration-laboratory application of the various phases of electronic field production, with special attention to directing and advanced editing techniques. Offered spring. Prereq: COMM 321.

COMM 422: 3 s.h.**Advanced Audio Production**

Intensive analysis of field and studio techniques, with emphasis on multitrack audio production and engineering. Lecture/lab course designed for students with a strong commitment to audio production. Emphasizes techniques of sound engineering, live/field recording, music studio and television control room. Offered periodically. Prereq: COMM 320.

COMM 426: 3 s.h.**Broadcast Workshop II (W)**

Emphasis on the writing of dramatic scripts with selective production. Offered spring. Prereq: COMM 320, 326, ENGL 110.

COMM 437: 3 s.h.**Documentary Filmmaking II**

Focused on the practical and technical aspects of documentary filmmaking. Students produce documentaries that incorporate appropriate approaches and styles as well as advanced storytelling techniques. Prereq: COMM 321, 337; junior standing. Offered periodically.

*Theatre***THEA 120: 3 s.h.****Stagecraft**

An introduction to technical theatre. Topics include the construction and handling of scenery, scenic painting, stage lighting and the proper, safe use of tools and equipment. Offered annually.

THEA 130: 3 s.h.**Acting I (G1)**

Training in the art and craft of acting. Emphasis on developing basic skills and exploring the creative process. Elementary scene and monologue work. Offered fall.

THEA 217: 3 s.h.**Theatre Appreciation (G1)**

A discussion of the theatre experience for the student with an interest in theatre, including audience perspective, historical influences, and contemporary performance and technical theatre practices. Offered fall, spring.

THEA 220: 3 s.h.**Lighting and Sound**

A "hands on" advanced study of stage lighting and sound design and reinforcement, and their relationship to theatrical design and production. Offered biannually. Prereq: THEA 120.

THEA 230: 3 s.h.**Acting II (G1)**

Further explores the purpose of acting and underlying principles, as well as training voice and body to project characterization. Offered biannually in spring. Prereq: THEA 130 or permission of instructor.

THEA 240: 3 s.h.**Script Analysis (G1)**

The techniques and methodology of script analysis, with an emphasis on those aspects useful to the production staff in preparation of plays for production. Offered biannually in the spring.

THEA 300: Variable credit (3 cr. minimum)**Co-op Experience in Theatre****THEA 312: 3 s.h.****History and Principles of Stage Design (G1)**

Scenic, costume and lighting design aesthetics throughout history and as they apply to today's theatre. Art experience is not required. Offered infrequently.

THEA 315: 3 s.h.

Directing

Practical experience in both directing and coaching actors. An overview of directing process and directing style. Offered biannually in spring. Prereq: THEA 130 or permission of instructor.

THEA 317: 3 s.h.**London Theatre Tour (P)**

Theatre as it developed in London, England. The course, in conjunction with the London Metropolitan University, requires attendance at four contrasting professional theatre performances in London as well as backstage tours of the Globe Theatre, the National Theatre and the Royal Theatre Drury Lane. Offered summer of even years. Prereq: junior status, COMM 100, ENGL 110.

THEA 340: 3 s.h.**History of Theatre I (G1, W)**

Detailed study of development of all phases of theatre art and dramatic literature from its origin to 1850. Offered in rotation with THEA 341. Prereq: ENGL 110, COMM 100.

THEA 341: 3 s.h.**History of Theatre II (G1, W)**

Survey of European and American drama from the time of Ibsen to the present, tracing development of dramatic literature from the rise of realism to contemporary experimentalism; emphasis on plays illustrating significant trends and movements. Offered in rotation with THEA 340. Prereq: ENGL 110, COMM 100.

THEA 350: 3 s.h.**Theatre Management**

Introductory survey of theatre management, which addresses concerns related to theatre. An overview of the theatre manager's role, with focus on strategic planning; organizational design; economics and the theatre; unions; and financial concerns which affect the success of theatre organizations. Offered infrequently. Prereq: COMM 100 and ENGL 110.

THEA 412: 3 s.h.**Topics in Theatre**

Advanced work in areas of theatre production. May be taken for credit more than one semester as the topics change. Topics include stage management, costume and makeup, scenic painting, stage voice, careers in theatre. Offered annually with different topics. Prereq: THEA 120.

THEA 498: 1-3 s.h.**Independent Study in Theatre**

For further information on independent study, see the *Special Academic Opportunities* section.

COMPUTER-AIDED DRAFTING & DESIGN TECHNOLOGY

See Applied Engineering, Safety & Technology

COMPUTER SCIENCE

See Computer Science and Physics

COMPUTER SCIENCE

College of Science and Technology

Associate Professor Hutchens, chairperson
 Professors Liffick, Schwartz, Webster
 Associate Professors Hardy, Zoppetti
 Assistant Professor Ghazizadeh

The Department of Computer Science offers a baccalaureate degree in computer science. It also offers a minor in computer science.

The Bachelor of Science degree program in computer science is accredited by CAC Commission of ABET. To be accredited, a university degree program has been certified as meeting requirements of academic excellence, including faculty, curriculum, computing resources, student preparation and institutional support. The Bachelor of Science degree program in computer science has been recognized as a high-quality degree program that meets national standards for computer science education. Our B.S. degree program in computer science was the first computer science program in a Pennsylvania State System University to be accredited by ABET.

The B.S. degree program in computer science is designed to provide students with a fundamental background in computer science as well as allow students to study advanced topics such as compiler design, artificial intelligence, robotics, mobile device application development, game development, human-computer interaction, algorithms, networking, computer graphics, security and parallel programming. Graduates are well prepared to pursue graduate study or a career in the computer field. Opportunities for student research are available.

For admission as a major in computer science, a student is expected to have a sound preparation in high school academic mathematics: algebra I and II, plane geometry, trigonometry and analytic geometry. Students who have completed an AP course in high school are encouraged to take the College Board Advanced Placement Exam in Computer Science and have their scores sent to Millersville University for evaluation. University credit for freshman-level computer science major courses will be offered to students with grades of 3 or higher. For further information, see *Advanced Placement Examinations* in this catalog.

The cooperative education program allows students to gain valuable experience in a full-time professional position related to their career goals, adding practical relevance to their program of study as well as financial remuneration. Students may elect one or more cooperative education experiences.

Information about the computer science degree program can be found on the web at cs.millersville.edu, or send email to info@cs.millersville.edu.

COURSE REQUIREMENTS

Computer Science Major (B.S.): 120 s.h.

Students must complete requirements A–F below.

A. Required CSCI Courses: 40 s.h.

CSCI 140, 161, 162, 330, 340, 362, 366, 370, 380, 420.

B. Required CSCI Electives: 12 s.h.

Three of the following: CSCI 300, 375, 395, 406 (4 cr.), 412, 415, 419, 425, 426, 435, 450, 456, 466, 467, 475, 476, 498.

C. Required Related MATH Courses: 10-11 s.h.

MATH 161, 235 (and PHIL 312 or MATH 211 or MATH 236 or above, but not 301, 304, 405).

D. Required Related Natural/Physical Sciences: 11-12 s.h.

At least 11 s.h. of natural/physical science courses—biology, chemistry, earth sciences and/or physics—that are intended for science majors. These courses must include two laboratory courses.

E. Total Required Related (C and D) must be at least 22 s.h.

F. Technical Writing Requirement

ENGL 312, Technical Writing, is the required course for the upper-level writing course under the General Education Curriculum Requirements.

Computer Science Minor: 20 s.h.

A. Required CSCI Courses: 12 s.h.

CSCI 161, 162, 362.

B. CSCI Electives: 8 s.h.

Choose any two computer science courses not in required CSCI courses above and not CSCI 350, at least one at the 300 level or above.

COURSE DESCRIPTIONS

CSCI 101: 4 s.h.

Introduction to Problem Solving with Computers (G2)

Designed to introduce concepts, techniques and history of computing to students who are not computer science majors. Emphasis on problem solving using the computer, including making calculations and presenting reports, tables and graphs based on those calculations. Collecting, storing, updating and retrieving data. Display and interpretation of information using the Internet. No credit toward computer science major.

CSCI 111: 4 s.h.

Introduction to Problem Solving with Visual Basic (G2)

Designed to introduce problem solving and computer programming to students who are not computer science majors. Topics include Windows® operating system, Visual Basic development environment, data types, objects and methods, graphical user interfaces, and programming structures such as decisions, repetition, arrays, sequential files and graphical display of data. No credit toward computer science major. Offered periodically.

CSCI 121: 4 s.h.

Introduction to Internet Programming (G2)

Designed to introduce Internet programming to students who are not computer science majors. Topics include web page design, scripting languages, graphics animation, image handling, event handling, document object model and graphical interface control objects. No credit toward computer science major. Offered periodically.

CSCI 140: 4 s.h.

Discrete Structures

Discrete mathematical structures and their application to computer science, including formal mathematical notation and proofs, algorithms, computer-related arithmetic, propositional logic, predicate logic, set theory, graphics, relations and databases, functions, matrices and combinatorics. Prereq: placement in MATH 160 or higher.

CSCI 161: 4 s.h.

Introduction to Programming I (G2)

Introduction to computer programming for the student intending to major in computer science or related fields. Emphasis on developing ability to apply problem-solving strategies to design and implement algorithms in a modern programming language. Prereq: placement in MATH 160 or higher.

CSCI 162: 4 s.h.

Introduction to Programming II (G2)

Continuation of CSCI 161 covering advanced computer programming techniques. Emphasis on object-oriented programming, specification, design, elementary data structures, and proper use of programming language and development tools. Abstract data types, classes and objects, recursion, linked lists, queues, stacks and binary trees. Prereq: C or higher in CSCI 161.

CSCI 330: 4 s.h.**Programming Languages and Software Engineering**

Relationship between programming languages and software engineering. Structure and vocabulary of modern programming languages. Objectives and methods of software engineering. Programming language topics include binding, data control and sharing, type checking, object-oriented programming, parallel programming and implementation of language constructs. Software engineering topics include requirements definition, specification, design, implementation, verification, validation and relationship of paradigms to languages. Offered fall, spring. Prereq: C- or higher in CSCI 140 and CSCI 162.

CSCI 340: 4 s.h.**Computational Models**

Introduction to theory of computation. Topics include finite-state automata, regular languages and grammars, pushdown automata, context-free languages and grammars, Turing machines, limits on algorithmic computation. Offered spring. Prereq: C- or higher in CSCI 140, 162.

PSYC/CSCI 350: 3 s.h.**Cognitive Science (P)**

Basic introduction to cognitive science. Reviews attempts to understand cognition, using insights from psychology, artificial intelligence, philosophy, linguistics and the neurosciences. Examines the synthesis of those attempts in the emergent field of cognitive science. Offered periodically. Prereq: COMM 100, ENGL 110, junior status. No credit given if credit earned in PSYC 314.

CSCI 362: 4 s.h.**Data Structures**

Abstract data types, objects, algorithm design and analysis, trees, graphs, sorting and searching. Emphasis on ADT-based and object-oriented design, incremental development and testing, and comparison of data structure implementations. Offered fall, spring. Prereq: C- or higher in CSCI 140 and CSCI 162.

CSCI 366: 4 s.h.**Database and Web Development**

Introduction to building database-driven web applications. Topics include data modeling, building databases, database queries, basic data management, Model View Controller design paradigm, server-side scripting, web development frameworks, web protocols, markup languages, and client-side scripting. Offered spring. Prereq: C- or higher in CSCI 362.

CSCI 370: 4 s.h.**Computer Architecture**

Structure of digital computers, including register transfer notation, instruction set architecture, computer arithmetic, pipelining and parallel processors. Offered fall. Prereq: C- or higher in CSCI 140, 162.

CSCI 375: 4 s.h.**Computer Graphics**

Theory and implementation of computer graphics, including mathematical basis for computer representation of 3D objects. Topics include graphics pipeline, vertex processing, 3D transformations, primitives, clipping, projections, rasterization, fragment processing, texturing, blending, shaders and lighting models. Offered periodically. Prereq: C- or higher in CSCI 362.

CSCI 380: 4 s.h.**Operating Systems**

Design and implementation of operating systems, including types of operating systems, file systems, resource management, concurrent processes, deadlocks, memory-management techniques, processor scheduling, disk scheduling, operating system security and system administration. Students expected to develop significant operating systems programming projects. Offered fall, spring. Prereq: C- or higher in CSCI 362, 370.

CSCI 395: 4 s.h.**Computer Networks (W)**

Introduction to computer networks. Topics include network media, architecture and topology, protocols and layering, client-server models, Ethernet media and hardware, TCP/IP and other protocols, setup and system administration, application protocols and communication, network servers and services, security, data integrity, encryption and firewalls. Offered periodically. Prereq: C- or higher in CSCI 362, ENGL 110.

CSCI 406: 1-4 s.h.**Topics in Computer Science**

This course allows students and faculty to explore various topics in computer science that are not included in other course offerings. CSCI 406 may be taken more than once for credit with departmental approval. Offered periodically. Prereq: depends on topic to be studied.

CSCI 412: 4 s.h.**e-Commerce: Concepts and Programming**

This course will provide students with the skills necessary to design and develop eCommerce websites. The course will cover the topics from disciplines of ecommerce, ebusiness and computer science. Topics include business models, marketing on the web, business-to-business strategies, online auctions, legal and ethical issues, and creation of secure and effective eCommerce websites using currently available platforms and technologies. Offered periodically. Prereq: C- or higher in CSCI 362.

CSCI 415: 4 s.h.**Computer and Network Security**

This course is designed to introduce students to topics which include attacks, standards, data integrity, symmetric key encryption, public key encryption, authentication, electronic mail security, IP security, web security, database security, secure electronic transactions, network management security, malicious software and firewalls. Offered periodically. Prereq: C- or higher in CSCI 362.

CSCI 419: 4 s.h.**Mobile Device App Development**

This course will provide students with the skills necessary to design, develop and deploy mobile device app technology. Emphasis is placed on introducing students to the development environments, software and hardware limitations, and GUI development and event-handling concepts when developing code to be executed on mobile devices. Concentrating on the fundamental concepts of mobile device development and the

techniques for building mobile device apps, such as networked mobile apps that interact with remote services such as GPS, Bluetooth services, wireless hubs and devices, web-based client/server data systems, and games. This course includes a laboratory component. Offered periodically. Prereq: C- or higher in CSCI 362.

CSCI 420: 4 s.h.

Software Engineering

Overview of software engineering concentrating on phases of the software development life cycle, including waterfall model, iterative enhancement, prototyping, axiomatic and algebraic specifications, user interface design and object-oriented design, testing, quality assurance and reliability. Team project provides students with practical experience in applying techniques. Offered fall, spring. Prereq: C- or higher in CSCI 330 and CSCI 362.

CSCI 425: 4 s.h.

Human-Computer Interaction

Design, evaluation and implementation of interactive computing systems for human use, including study of the major phenomena surrounding them. Presents a broad overview of the field, with an emphasis on interface development and evaluation. Offered periodically. Prereq: C- or higher in CSCI 362 required; CSCI 380 recommended.

CSCI 426: 4 s.h.

Adaptive Technologies (D)

An overview of the principles and techniques used in adaptive technology for the disabled. Topics include the universal design principle; user-centered design; interfacing specialized hardware devices; interaction methods such as Morse code, voice recognition and generation, scanning techniques, word expansion and word prediction; modes of communication such as single or multi-switch, audio and voice; alternative languages; Web accessibility; and usability testing as a means of user/device evaluation and product acceptance. Offered periodically. Prereq: C- or higher in CSCI 362.

CSCI 435: 4 s.h.

Compiler Construction

Students implement a compiler for a simplified modern programming language. Theory of compiler construction, including finite-state automata, LL(1) grammars and top-down parsing. Project includes lexical and syntax analysis, name storage, scope and type analysis, error recovery and code generation. Advanced topics covered as time permits, including LR(k) grammars, bottom-up parsing, compiler generators (e.g., LEX and YACC) and code optimization. Offered periodically. Prereq: C- or higher in CSCI 330, 340, 362.

CSCI 450: 4 s.h.

Artificial Intelligence (W)

Introduction to artificial intelligence, including problem solving, search, heuristic methods, machine learning, knowledge representation, natural language processing, computer vision, expert systems, theorem proving and current applications. Concepts illustrated through programs developed in a functional language. Offered periodically. Prereq: C- or higher in CSCI 362; ENGL 110.

CSCI 456: 4 s.h.

Robotics and Computer Vision

Intelligent robotic systems that deal with the physical world through visual, acoustic or tactile sensing. Fundamentals of robot vision, including image acquisition and camera geometry, pattern recognition, representation and analysis of shape, pixel neighborhoods, connectivity, distance measures, arithmetic operations on pixels and images, computations of area, centroid, moments, axis of least inertia, correlation techniques, histogram computation, manipulation of robot end effectors, robot task coordination and simple Cartesian robot manipulation. Offered periodically. Prereq: C- or higher in CSCI 362.

CSCI 466: 4 s.h.

Database Management Systems

Introduction to software design using relational and pro-relational database management systems. Data modeling, data normalization, database and application design, foundations of relational implementation, SQL, embedded SQL, and web publishing of database contents. Offered periodically. Prereq: C- or higher in CSCI 362.

CSCI 467: 4 s.h.

Design and Analysis of Algorithms

Theory and techniques of algorithm design and analysis. For design, students will study a variety of algorithmic solutions to problems from application areas, including searching, selecting, sorting, graph theory, number theory and encryption. Design paradigms, including greedy method, divide and conquer, dynamic programming, backtracking and branch-and-bound. For analysis, students will use formal techniques to classify execution time of an algorithm. Software tools are used to measure resources used by a program during execution. Offered infrequently. Prereq: C- or higher in CSCI 340.

CSCI 475: 4 s.h.

3D Game Programming and Computer Animation

Provides students with skills and solid technical foundation necessary to design, develop and deploy 3D games and related entertainment technology applications. Topics include 3D game programming, 3D graphics, game design, programming video game controllers, collision detection, force and motion calculations, networking multiplayer games, manipulating sound objects, physical modeling, projectiles, particle systems, physical constraints, deformation of virtual 3D objects, surface deformation, computer animation, forward and inverse kinematics, keyframe motion capture and procedural animation, and behavior-based animation and control. Offered periodically. Prereq: C- or higher in CSCI 362.

CSCI 476: 4 s.h.

Parallel Programming

Overview of parallel computing through study of parallel programming. Topics include message-passing, highly parallel computations, partitioning and divide-and-conquer strategies, pipelined and synchronous computations, load balancing and termination detection, programming with shared memory systems, parallel sorting algorithms, numerical algorithms, image processing, searching and optimization, and parallel programming using current technology. Offered periodically. Prereq: C- or higher in CSCI 362, 370.

CSCI 498: 1-4 s.h.

Independent Study in Computer Science

Independent study is available for well-qualified students. Students who receive approval for independent study are expected to complete a sig-

nificant study or project in some area of computer science. A written report is required. Prereq: departmental permission.

CONSTRUCTION TECHNOLOGY

See Applied Engineering, Safety & Technology

COOPERATIVE EDUCATION/INTERNSHIP

The minimum number of credits for any cooperative experience is 3 credits. The maximum number of credits allowed for one cooperative education course is 12. For information on cooperative education and internships, see the *Special Academic Opportunities* section.

COURSE DESCRIPTIONS

***300: 3-6 s.h.**

Entry-level cooperative education or internship experience giving initial exposure to departmentally approved job assignment.

***400: 3-6 s.h.**

Cooperative education or internship assignment with increased work responsibility over the COOP 300 level. Prereq: 300 level or equivalent.

***500: 3-6 s.h.**

Cooperative education or internship assignment with increased work responsibility over the COOP 400 level. Prereq: 400 level or equivalent.

*Subject abbreviation is dependent upon the department through which the cooperative education credit is earned (e.g., CSCI 300).

CRIMINOLOGY

See Sociology/Anthropology

EARLY, MIDDLE & EXCEPTIONAL EDUCATION

College of Education and Human Services

Professor Kerper, chairperson

Professor Wenrich

Associate Professors Colabucci, Heilshorn, P. Himmele, W. Himmele, Nell, Shettel

Assistant Professors Hossain, Josephson, Mehrenberg, Petula, Powers, Tamakloe, Wolfgang

Early Childhood Education

The student may elect to earn Pennsylvania licensure (certification) in early childhood education (PreK – Grade 4). The program in early childhood education is designed to provide the student with an in-depth knowledge of subject matter and pedagogy appropriate for all students, including those for whom English is a second language. The program also provides extensive and varied field experiences.

The student who completes the early childhood program at Millersville University receives a Bachelor of Science in Education degree and may apply for a Pennsylvania Instructional I teaching certificate. Each student is strongly urged to complete an academic minor from the University's list of approved minors that includes a minor in Integrative STEM Education Methods.

Early Childhood/Special Education (Dual Major)

The student may elect to earn Pennsylvania licensure (certification) in early childhood education (PreK–Grade 4) and special education (PreK–Grade 8). The program is designed to provide the student with an in-depth knowledge of subject matter and pedagogy appropriate for all students, including those with disabilities and those for whom English is a second language. The program also provides extensive and varied field experiences.

The student who completes the early childhood/special education program at Millersville University receives a Bachelor of Science in Education degree and may apply for a Pennsylvania Instructional I teaching certificate with endorsement in early childhood education and special education. Each student is strongly urged to complete an academic minor from the University's list of approved minors that includes a minor in Integrative STEM Education Methods.

Middle-Level Education

The student may elect to earn Pennsylvania licensure (certification) in middle-level education (Grade 4–Grade 8). The program in middle-level education is designed to provide the student with an in-depth knowledge of subject matter and pedagogy appropriate for all students, including those for whom English is a second language. The program also provides extensive and varied field experiences.

The student will complete a minimum of 30 credit hours in one of the four content areas of English language arts, mathematics, science or social studies. In addition, the student will complete a minimum of 12 credit hours in each of the three remaining content areas, a minimum of 27 credit hours in the Professional Core and 12 credit hours in student teaching.

The student who completes the middle-level program at Millersville University receives a Bachelor of Science in Education degree and may apply for a Pennsylvania Instructional I teaching certificate. Each student is strongly urged to complete an academic minor from the University's list of approved minors.

COURSE REQUIREMENTS

Early Childhood (PreK–Grade 4) Education Major: 120 s.h.

**Advanced Professional Studies (APS)*

Major Sequence Requirements: ERCH 110, ERCH 315, ERCH 316, ERCH 345*, ERCH 435, ERCH 485*, SPED 311*, SPED 312, EDFN 320 with grades

of C (2.0) or higher.

Foundations Block: ERCH 225, EDFN 211, EDFN 241 with grades of C (2.0) or higher. A field experience allows students to make application of their knowledge.

Professional Block I: ERCH 421*, ERCH 496* (6 credits) with grades of C (2.0) or higher. A field experience allows students to make application of their knowledge.

Professional Block II: ERCH 422* (6 credits), ERCH 455*, ERCH 465*, SPED 331* with grades of C (2.0) or higher. A field experience allows students to make application of their knowledge.

Required Related Courses: ART 100, MATH 104, MATH 105, PSYC 227, WELL 240 with grades of C (2.0) or higher.

Certification Requirement: Literature course with an English (ENGL) prefix with a grade of C (2.0) or higher.

Student Teaching: 12 credits.

Early Childhood (PreK–Grade 4)/Special Education (PreK–Grade 8) Major: 135 s.h.

**Advanced Professional Studies (APS)*

Major Sequence Requirements: ERCH 110, ERCH 345*, ERCH 435, ERCH 485*, EDUC 424*, SPED 101, SPED 311*, EDFN 320 with grades of C (2.0) or higher.

Foundations Block: ERCH 225, EDFN 211, EDFN 241, SPED 237 with grades of C (2.0) or higher. A field experience allows students to make application of their knowledge.

Professional Block I: ERCH 421*, SPED 321*, SPED 341* with grades of C (2.0) or higher. A field experience allows students to make application of their knowledge.

Professional Block II: ERCH 422* (6 credits), ERCH 455*, ERCH 465*, SPED 331* with grades of C (2.0) or higher. A field experience allows students to make application of their knowledge.

SPED Professional Block: Strand I courses or Strand II courses.

Strand I (Severe/Multiple Disabilities): SPED 411*, SPED 441*, SPED 442*, SPED 451*, SPED 453* with grades of C (2.0) or higher. A field experience allows students to make application of their knowledge.

Strand II (Mild/Moderate Disabilities): SPED 412*, SPED 441*, SPED 442*, SPED 452*, SPED 453* with grades of C (2.0) or higher. A field experience allows students to make application of their knowledge.

Required Related Courses: ART 141, MATH 104, MATH 105, PSYC 227, WELL 240 with grades of C (2.0) or higher.

Certification Requirement: Literature course with an English (ENGL) prefix with a grade of C (2.0) or higher.

Student Teaching: 12 credits.

Middle-Level Education (Grade 4–Grade 8) Major: 123 s.h.

**Advanced Professional Studies (APS)*

Major Sequence Requirements: MDLV 335, SPED 311*, SPED 312, PSYC 227.

Foundations Block: EDFN 211, EDFN 241 with grades of C (2.0) or higher. A field experience allows students to make application of their knowledge.

Professional Block I: EDUC 323*, MDLV 486*, EDFN 320 with grades of C (2.0) or higher. A field experience allows students to make application of their knowledge.

Professional Block II: MDLV 425* (6 credits), MDLV 456*, MDLV 466*, SPED 331* with grades of C (2.0) or higher. A field experience allows students to make application of their knowledge.

Certification Requirement: Literature course with an English (ENGL) prefix with a grade of C (2.0) or higher.

Student Teaching: 12 credits.

English Language Arts Concentration: ENGL 220, ENGL 230, ENGL 272, ENGL 486, ENGL 487 and one elective with grades of C (2.0) or higher. Also required: MATH 104, MATH 204, MATH 205, MATH 230, BIOL 100, CHEM 102, PHYS 101, ESCI 202, GEOG 141, GOVT 111, HIST 106 and one history elective with grades of C (2.0) or higher.

Mathematics Concentration: MATH 104, MATH 204, MATH 205, MATH 230 with grades of C (2.0) or higher and MATH 161, MATH 211, MATH 311 plus two mathematics electives with grades of C- (1.7) or higher, except MATH 301 with a grade of C (2.0) or higher. Also required: BIOL 100, CHEM 102, PHYS 101, ESCI 202, GEOG 141, GOVT 111, HIST 106 and one history elective with grades of C (2.0) or higher.

Science Concentration: BIOL 100 or BIOL 101, BIOL 140, CHEM 111, CHEM 112, ESCI 202, ESCI 221, PHYS 131, PHYS 132 with grades of C (2.0) or higher. Also required: MATH 104, MATH 204, MATH 205, MATH 230, GEOG 141, GOVT 111, HIST 106 and one history elective with grades of C (2.0) or higher.

Social Studies Concentration: ECON 102, GEOG 141, GOVT 111, HIST 101, HIST 106, HIST 206, HIST 260, ECON 101 or ECON 203, GOVT 112 or GOVT 251, and one geography elective with grades of C (2.0) or higher. Also required: MATH 104, MATH 204, MATH 205, MATH 230, BIOL 100, CHEM 102, PHYS 101, ESCI 202 with grades of C (2.0) or higher.

Advanced Professional Studies (APS)

The student must satisfy all requirements listed below for admission to courses designated as APS.

1. A minimum of 48 s.h. in progress.
2. Cumulative GPA of 3.0; GPA of 2.80-2.99 requires higher test scores on Content Area Tests for Pennsylvania licensure (certification)*.

3. Satisfy one of the four Pre-Service Testing options*.
4. Pass one English (ENGL) composition course.
5. Pass one English (ENGL) literature course.
6. Pass two mathematics courses (100 level or above).
7. Pass Education Foundations courses (EDFN 211 and EDFN 241) and receive a favorable faculty recommendation.
8. File an APS application online.

*Cannot be appealed.

COURSE DESCRIPTIONS

ERCH 110: 3 s.h.

Introduction to Early Childhood Education

Designed to provide an overview of the field of early childhood education. Historical, theoretical and philosophical influences on past and current approaches to teaching young children will be traced and analyzed. The course introduces students to the early childhood education profession, developmental characteristics of young children (birth–age 9), developmentally appropriate practices (NAEYC, 2009) and an overview of effective curriculum, instruction and assessment of young children. In the concurrent field experience, students reflect on their ability to cope with classroom reality as they affirm or change their choice of teaching as a profession. Prereq: Act 34 Clearance, Act 151 Clearance and Act 114 FBI Clearance. Offered spring, fall. Coreq: SPED 312.

ERCH 225: 3 s.h.

Foundations of Reading

Introduces topics in the field of teaching reading in early childhood, including emergent literacy, approaches to reading instruction, word recognition and vocabulary development, comprehension instruction, assessment techniques and reading instruction for the multicultural and the exceptional child. Supplemented by a field experience. Offered fall, spring. Prereq: ERCH 110, Act 34 Clearance, Act 151 Clearance and Act 114 FBI Clearance.

ERCH 315: 3 s.h.

Family and Community: Aspects of Diversity (D, W)

A focus on collaborative relationship building between home, school and community that facilitates positive influence on the individual child's development. These collaborative relationships create an inclusive learning environment for all children, including culturally and linguistically diverse. The collaborative relationships are based on developing reciprocal communication techniques, cultural sensitivity and rapport with children and their families. Promotes effective communication and advocacy skills for students with disabilities and their families between school, agency personnel and community members. Empowerment techniques and parent workshops are developed to encourage parent involvement, with emphasis on families who traditionally have been excluded from the collaborative process in the schools and developing parental self-efficacy skills. Offered spring, fall. Prereq: ENGL 110 or ENGL 110H; ERCH 225; EDFN 211, 241.

ERCH 316: 3 s.h.

Creative Experiences for the Young Child

An emphasis on making appropriate instructional and curricular decisions to provide creative opportunities for young children; special attention to rhythmic, aesthetic and dramatic avenues of expression; application of ideas through actual experiences with young children. Offered fall, spring. Prereq: C or higher in ERCH 110.

EDUC 323: 3 s.h.

Teaching Reading in the Content Areas (W)

A course designed to help students develop an understanding of the reading process in the major subject areas. Specific literacy strategies, study skills and reference techniques used in various subjects are investigated. Offered spring. Prereq: ENGL 110, admission to Advanced Professional Studies (APS).

MDLV 335: 3 s.h.

Literature for Children and Young Adolescents

Prepares middle-level teacher candidates to recognize high-quality literature for youth from ages 10 to 14. Grounded in adolescent psychology, it guides teacher candidates in the identification of literature, across genres and content areas, that is relevant to the lives of adolescents. The course engages teacher candidates in collaborative approaches to literature study, modeling best practices for the instruction of adolescents. Response to literature receives emphasis. Offered spring. Prereq: PSYC 227.

ERCH 345: 3 s.h.

Social Studies for the Young Learner

Teacher candidates will apply the standards and thematic strands of social studies as defined by the National Council for the Social Studies for the PreK–4 developmental level. Emphasis is on the learner building civil competence and acquiring knowledge, skills and attitudes in civics and government, economics, history and geography. Offered fall, spring. Prereq: EDFN 211, EDFN 241, ERCH 225, admission to Advanced Professional Studies (APS).

ELED 371: 3 s.h.

Teaching Gifted and Able Children

Designed to acquaint prospective teachers with some viable techniques for dealing with gifted and able children in their classrooms. Some attention will also be paid to reviewing existing programs and means of identification. Some work with gifted students in the schools will be another component of the course. Offered annually.

EDUC 403: 3 s.h.

Cultural Diversity: Pluralism in the Classroom (D, W)

Provides historical and present-day information about different racial, cultural and linguistic groups represented in our society. Explores the challenge of providing an equitable and effective education to all, and provides methods and materials that can be used in the classroom. Offered annually. Prereq: ENGL 110.

ERCH 485: 3 s.h.**Teaching Young English Language Learners**

Prepares early childhood teacher candidates to understand the social and linguistic foundations for first and second language development in the early years. Teacher candidates will be able to apply research-based strategies for supporting first language development in the home and for preparing young learners for the transitions to schooling in a second language. Candidates will demonstrate an understanding of the resources that young learners bring to academic settings, and of ways to support young learners and their families in their adjustments to English-speaking schools. Candidates will demonstrate the ability to use assessment data to differentiate and modify instruction according to the needs of their students. Teacher candidates will be prepared to support young English language learners in their acquisition of language and content within optimal learning environments that provide meaningful access to standards-based instruction. Offered fall, spring. Prereq: ENGL 110, admission to Advanced Professional Studies (APS).

ELED 419: 3 s.h.**Seminar in Early Childhood Education**

Investigation of contemporary goals of early childhood education. Provides analysis of organizational plans, classroom environment, teaching strategies and resources, and noteworthy trends and innovations. Application to individual situations is stressed. Focus will vary. Offered infrequently.

ERCH 421: 3 s.h.**Language Development and Emergent Literacy**

Examines children's oral language development and its contribution to emergent literacy, the period between birth and the time when children learn to read and write in a conventional manner. Appropriate content and skill competencies will be covered. Strategies to enhance the family/home/school connection will be explored. A field experience will be part of this course. Offered fall, spring. Prereq: admission to Advanced Professional Studies.

ERCH 422: 6 s.h.**Teaching of Literacy, PreK-4: Processes, Skills and Strategies**

This course develops pedagogy in the teaching of reading and the related language arts in grades PreK-4. Keeping with current theory that the communication processes—reading, writing, listening and speaking—cannot arbitrarily be divided, this course will present pedagogy in an interrelated and integrated format. Understandings, teaching strategies and techniques will be consistent with the state testing system and the state standards for literacy instruction. Throughout this course, students will be expected to exhibit professional behaviors as delineated in Administrative Guidelines for the Assessment of the Professional and Ethical Dispositions of Professional Education Unit Candidates (www.millersville.edu/academics/educ/education/files/dispositions.pdf). Students will have opportunities to establish the habit of ongoing professional growth. Offered fall, spring. Prereq: admission to Advanced Professional Studies. Coreq: ERCH 455, 465, SPED 331.

EDUC 424: 3 s.h.**Diagnostic Reading (W)**

The first of two elective courses in diagnostic reading for undergraduate students will be an introduction to various formal and informal means to assess the reading strengths and needs of children. Offered fall, spring. Prereq: ERCH 225, ENGL 110, admission to Advanced Professional Studies (APS).

MDLV 425: 6 s.h.**Teaching of Literacy, Grades 4-8: Processes, Skills and Strategies**

This course develops pedagogy in the teaching of reading and the related language arts in grades 4-8. Keeping with current theory that the communication processes—reading, writing, listening and speaking—cannot arbitrarily be divided, this course will present pedagogy in an interrelated and integrated format. Understandings, teaching strategies and techniques will be consistent with the state testing system and the state standards for literacy instruction. Throughout this course, students will be expected to exhibit professional behaviors as delineated in Administrative Guidelines for the Assessment of the Professional and Ethical Dispositions of Professional Education Unit Candidates (www.millersville.edu/academics/educ/education/files/dispositions.pdf). Students will have opportunities to establish the habit of ongoing professional growth. Offered fall, spring. Prereq: admission to Advanced Professional Studies.

EDUC 433: 3 s.h.**Gender and Race Issues in Children's Literature (D, P)**

Children's literature will be examined in light of recent psychological, sociological and educational research on sexism and racism. Offered fall, spring. Prereq: COMM 100, ENGL 110, junior status.

ERCH 435: 3 s.h.**Literature for the Young Child**

Prepares early childhood teacher candidates to recognize high-quality literature for children from birth to age nine. The use of literature to promote children's language, intellectual, emotional, social/moral and aesthetic/creative development is highlighted. A focus on children's responses to literature is provided. Offered fall, spring. Prereq: PSYC 227; EDFN 211, 241; ERCH 225.

ERCH 455: 3 s.h.**Teaching Mathematics to Young Children**

Teacher candidates will apply the principles that guide all mathematics instruction as specified by the National Council of Teachers of Mathematics for the PreK through 4th-grade developmental level. Candidates will effectively deliver core mathematics content as well as have skills to stay current with the research on best practices in mathematics education. Prereq: MATH 105, admission to Advanced Professional Studies. Coreq: ERCH 422, 465, SPED 331. Offered fall, spring.

ERCH 465: 3 s.h.**Science for the Young Learner**

Provides overview of the content and processes included in an early childhood (PreK-4) science program. The course includes a study of methodology appropriate to the school setting. Prereq: admission to Advanced Professional Studies. Coreq: ERCH 422, 455, SPED 331. Offered fall, spring.

MDLV 466: 3 s.h.

Teaching of Science: An Inquiry Approach (W)

Focuses on the teaching of science through inquiry in the middle grades. Inquiry-based strategies stress evidence-based argumentation, experimentation and the building of student understanding of the nature of science through active involvement. Prereq: ENGL 110, admission to Advanced Professional Studies. Coreq: MDLV 425, 456, SPED 331. Offered fall, spring.

MDLV 456: 3 s.h.**Teaching Middle-Level Mathematics**

Pedagogy for teaching middle-level mathematics is aligned with national and state standards, current research, forms of assessment and curricular frameworks. Technology and hands-on instructional strategies are utilized. Prereq: MATH 205, MATH 230 and admission to Advanced Professional Studies. Coreq: MDLV 425, 466, SPED 331. Offered fall, spring.

EDUC 475: 3 s.h.**Current Trends in Education**

A survey of current and future curricular and instructional trends in education. Emphasis on identification, examination and evaluation of topics; methods; strategies and issues affecting teaching and learning. Offered infrequently.

ERCH 485: 3 s.h.**Teaching Young English Language Learners**

Prepares early childhood teacher candidates to understand the social and linguistic foundations for first and second language development in the early years. Teacher candidates will be able to apply research-based strategies for supplying first language development in the home and for preparing young learners for the transitions to schooling in a second language. Candidates will demonstrate an understanding of the resources that young learners bring to academic settings, and of ways to support young learners and their families in their adjustments to English-speaking schools. Candidates will demonstrate the ability to use assessment data to differentiate and modify instruction according to the needs of their students. Teacher candidates will be prepared to support young English language learners in their acquisition of language and content within optimal learning environments that provide meaningful access to standards-based instruction. Prereq: ENGL 110, admission to Advanced Professional Studies. Offered fall, spring.

ERCH 496: 6 s.h.**Curriculum, Instruction and Assessment: Engaging the Young Learner**

Prepares teacher candidates in areas of curriculum, instruction and assessment from infancy through kindergarten. Focus on curricular philosophy and theory, approaches to early childhood education, pedagogical content knowledge, child development and assessment of young learners. Current research, practices and trends will be considered. A field experience will be part of this course. Offered fall, spring. Prereq: admission to Advanced Professional Studies. Coreq: ERCH 421.

MDLV 486: 3 s.h.**Teaching English Language Learners in the Middle Level (P)**

Prepares teacher candidates to understand cross-cultural and linguistic foundations of acquiring a new language. Teacher candidates will apply research-based strategies for providing English language learners (ELLs) with optimal learning environments that provide meaningful access to standards-based instruction in grades 4-8. This course places a special emphasis on instructional planning that facilitates student success with academic language and academic texts in upper-elementary settings. Candidates will demonstrate the ability to use assessment data to differentiate and modify instruction. Candidates will also demonstrate an understanding of schools' legal responsibilities toward ELLs and their families. Offered fall, spring. Prereq: COMM 100, ENGL 110 and admission to Advanced Professional Studies.

EDUC 486: 3 s.h.**Topics in Education**

In-depth investigation and development of one or more topics of current interest not normally covered in regular courses. Special topics/methods will vary according to the needs of students and faculty. Offered infrequently.

ELED 498: 1-3 s.h.**Independent Study**

Conferences and seminars designed for special study of particular topics in elementary education. Emphasis on new and emerging curriculum for teaching. Prereq: 60 s.h. and approval of the department chairperson. Offered periodically.

ELED 489, 499: 1-4 s.h.**Departmental Honors**

For the definition of departmental honors and eligibility, refer to the *Special Academic Opportunities* section of this catalog.

EDEL 461: 6 s.h.**EDEL 462: 6 s.h.****Student Teaching and Seminar**

Students must satisfactorily complete student teaching in order to qualify for certification. Seminar sessions are required. Students in the dual-certification elementary and special education program must have one experience in an elementary classroom and one experience in a special education classroom. Offered fall, spring. Prereq: admission to Advanced Professional Studies (APS).

SPED 311: 3 s.h.**Assessment for Designing and Implementing Instruction**

This course enables teacher candidates to develop competencies for assessing students in an inclusive classroom setting, design instruction and make instructional decisions to enhance students' learning. Teacher candidates learn how to assess, analyze and interpret data from formal (standardized) and informal (traditional and alternative) testing sources and measurement. Teacher candidates learn how to interpret reports as relevant to students from diverse learning backgrounds and use these interpretive results along with behavioral observation, task analysis and other types of measurement to design instruction. Offered fall, spring. Prereq: Act 34, 151, FBI clearances and admission to Advanced Professional Studies.

SPED 312: 3 s.h.**Serving Individuals with Disabilities in Inclusive Settings**

Prepares educators to effectively teach children with disabilities in inclusive classrooms by incorporating theory, identification, services, instruction and legal aspects of special education. Course participants will learn to plan, adapt and implement effective instruction and assessment to facilitate academic achievement for learners with mild and moderate disabilities in an inclusive setting. Offered fall, spring. Coreq: ERCH 110, ACT 34,151, FBI clearances.

SPED 321: 3 s.h.**Serving Individuals with Severe and Multiple Disabilities in Inclusive Settings (W)**

This course prepares teacher candidates to effectively teach students with severe and multiple disabilities within an inclusive educational system. By incorporating theory with aspects for identification, specialized support services, instruction and relevant special education law, teacher candidates become knowledgeable of their responsibilities as teachers of students with severe and multiple disabilities. Teacher candidates learn to differentiate and individualize instruction for the developmental and chronological requirements of their students. Teacher candidates become practiced in referencing alternate learning standards and general education curricula to facilitate the achievement of their students with severe and multiple disabilities in a variety of learning environments. Offered spring, fall. Prereq: ENGL 110; Act 34, 151, FBI clearances and admission to Advanced Professional Studies (APS). Coreq: ERCH 421, SPED 341.

SPED 331: 3 s.h.**Positive Learning Environments for All Students**

Students will develop the ability to effectively analyze and design inclusive educational environments to optimize the achievement of every student, and will receive the knowledge and skills to modify their teaching methods to motivate and support positive social skills in diverse students. Through the use of appropriate assessments and data-collection techniques for individual student behaviors, students will develop the ability to conduct functional behavior assessments and apply behavior-intervention plans and positive techniques as needed. Offered fall, spring. Required submission of satisfactory FBI, Act 34/151 clearances; admission to Advanced Professional Studies (APS).

SPED 341: 3 s.h.**Early Intervention to Kindergarten: Integrating Curriculum**

This course examines the implications of federal mandates for providing educational and supportive services for infants/toddlers/preschoolers with disabilities and their families. The teacher candidates gain knowledge in interpreting data from formal and informal sources to be utilized in developing Individualized Family Service Plans (IFSP). The teacher candidates use case study and field experience data to recommend appropriate school-based programs for young children with disabilities. They also implement effective teaching strategies to meet the family, academic, social, emotional and behavioral needs of young children with disabilities in inclusionary environments. These strategies will be applied in field placements during the semester. Offered fall, spring. Prereq: EDFN 211, 241; ERCH 225; SPED 237; Act 34, 151, 114 clearances and admission to Advanced Professional Studies (APS). Coreq: ERCH 421, SPED 321.

SPED 411: 3 s.h.**Formal and Informal Assessments for Students in Need of Pervasive and Intensive Supports (Strand I, Specialized Supports)**

This course provides teacher candidates with the necessary skills to administer, score and interpret a range of formal and informal educational assessments typically used with students with severe and multiple disabilities. Teacher candidates develop their ability to apply variables such as reliability, validity and norm references to select appropriate assessment tools for their students and to develop informal evaluations as needed. Teacher candidates apply their knowledge of required procedures, with students' assessment results, to construct appropriate Individual Education Programs (IEP) with multidisciplinary team members and use those IEPs to plan instruction. Prereq: Act 34, 151, FBI clearances, admission to Advanced Professional Studies and Professional Block I courses of ERCH 421; SPED 321, 341. Coreq: SPED 441, 451, 453, 454. Offered fall.

SPED 412: 3 s.h.**Formal Assessment for Students with Mild and Moderate Disabilities (Strand II, General Education Supports)**

This course prepares teacher candidates to develop competencies for administration, scoring and interpretation of formal assessment devices typically used in educational evaluations. Teacher candidates acquire knowledge of the process of how to select formal assessment tools in terms of reliability, validity and norm populations, and learn about integrated systems of assessment and data collection for identification of students struggling to meet academic and behavioral expectations. Teacher candidates will learn the role of educational evaluations in developing Individual Education Programs (IEP) for students in need of support in the general education curriculum. Teacher candidates learn how to collaborate with parents and include them as equal partners in the assessment process. Prereq: Act 34, 151, FBI clearances; admission to Advanced Professional Studies; Professional Block I courses of ERCH 421, SPED 321, 341. Coreq: SPED 441, 442, 452, 453. Offered fall, spring.

SPED 441: 3 s.h.**Effective Instruction for Students with Disabilities: Supports for Specialized Curriculum (Strand I, Specialized Supports)**

This course provides teacher candidates with research-based methods and special techniques to effectively instruct students with severe/profound and multiple disabilities within a variety of educational settings. Teacher candidates develop the teaching skills required to plan for and institute positive intervention strategies in relevant curricular areas, including perceptual, motor, daily living, communication, leisure and socialization. The emphasis of this course will be upon implementing the Individualized Education Programs (IEP). Focus will be upon lesson plans, task analyses and accommodating students who require extensive or pervasive instructional supports, and adapting specialized curricula to meet their learning needs. Prereq: Act 34, 151, FBI clearances; admission to Advanced Professional Studies; Professional Block I courses of ERCH 421, SPED 321, SPED 341. Coreq: SPED 411/412, 442, 451/452, 453. Offered fall, spring.

SPED 442: 3 s.h.**Effective Instruction for Students with Disabilities: Support for the General Education Curriculum (Strand II, General Education Supports)**

This course is designed to prepare teacher candidates to provide effective instruction to children with mild disabilities. The course will focus on developing skills for high-quality instruction based on research-based practices used to design and adapt curriculum to provide high-quality, standard-based instruction for students with mild disabilities, with an emphasis on the inclusive classroom. Course participants will learn to plan, implement and assess the results of effective instruction aligned with students' academic, social, emotional and behavioral needs to facilitate academic achievement, with an emphasis on development of literacy skills for students in need of supports in general education. Prereq: Act 34, 151,

FBI clearances; admission to Advanced Professional Studies; Professional Block I courses of ERCH 421, SPED 321, 341. Coreq: SPED 411/412, 441/442, 452, 453, 454. Offered fall, spring.

SPED 451: 3 s.h.

Individualized Educational Planning: Focus on Transition of Students with Multiple/Severe Disabilities (Strand I, Specialized Supports)

This course prepares teacher candidates with the skills to plan, design and deliver instruction focused on integrated life-span perspectives of students with severe and multiple disabilities. A student's success in school can be linked, at least in part, to effective grade-to-grade transition practices and strategies. Teacher candidates learn to develop strategies for vertical (sequential and occurring over time) or horizontal (occurring at the same time) transitions. Teacher candidates develop their knowledge of the variety of appropriate K-8 educational environments for their students and plan for these transitions based upon current special education laws and regulations, and the most effective research-based practices. Teacher candidates identify their students' needs, preferences and interests, and incorporate this information into their goals, objectives and plans. In keeping with a student's Individualized Education Program (IEP), teacher candidates compile necessary data with the intent of facilitating successful future experiences. Prereq: Act 34, 151, FBI clearances; admission to Advanced Professional Studies, ERCH 421; SPED 321, 341. Coreq: SPED 411, 441, 442, 453. Offered fall.

SPED 452: 3 s.h.

Individualized Educational Planning: Focus on Transition for Students with Mild/Moderate Disabilities (Strand II, General Education Supports)

This course prepares teacher candidates with the skills to plan, design and deliver instruction focused on integrated life-span perspectives of students with mild to moderate disabilities. There is a great deal of information indicating that a child's success in school can be linked, at least in part, to effective grade-to-grade transition practices and strategies. Teacher candidates learn to develop strategies for vertical (sequential and occurring over time) or horizontal (occurring at the same time) transitions. Teacher candidates develop their knowledge of the variety of appropriate K-8 educational environments for their students and plan for these transitions based upon current special education laws and regulations, and the most effective research-based practices. Teacher candidates conduct and use comprehensive grade-to-grade transition evaluations and learn strategies to identify their students' needs, preferences and interests, and incorporate this information into their goals, objectives and plans. In keeping with a student's Individualized Education Program (IEP), teacher candidates compile necessary data with the intent of facilitating successful future experiences. Prereq: Act 34, 151, FBI clearances; admission to Advanced Professional Studies, ERCH 421, SPED 321, 341. Coreq: SPED 412, 441, 442, 453. Offered fall, spring.

SPED 453: 3 s.h.

Reflective Practices: Working with Diverse Families of Students with Disabilities (Strand I, Specialized Supports; Strand II, General Education Supports) (W)

This course prepares teacher candidates with the necessary skills to develop cultural sensitivity to work effectively with diverse families and their students with disabilities (mild/moderate; severe/multiple disabilities). Teacher candidates explore culture and diversity as they apply to families, educators and influences on daily activities, identity development, and systems of power and privilege in the educational system. Teacher candidates develop their ability to be culturally responsive, open and respectful educators. Teacher candidates develop their professional dispositions consistent with family- and student-centered educational planning, program implementation and community collaboration centered on students with disabilities (mild/moderate; severe/multiple disabilities) and their diverse families. Prereq: ENGL 110; Act 34, 151, FBI clearances; admission to Advanced Professional Studies and ERCH 421; SPED 321, 341. Coreq: SPED 411/412, 441, 442, 451. Offered fall, spring.

EDSP 461: 6 s.h.

Student Teaching—Special Education: 1st Half-Semester

EDSP 462: 6 s.h.

Student Teaching—Special Education: 2nd Half-Semester

Full-time practicum experiences where students have an opportunity to apply educational strategies and interventions for students with mild, moderate and severe disabilities. Admission to Advanced Professional Studies (APS).

SPED 489, 499: 1-4 s.h.

Departmental Honors

For the definition of departmental honors and eligibility, refer to the *Special Academic Opportunities* section of this catalog.

SPED 498: 1-3 s.h.

Independent Study

For further information, see the *Special Academic Opportunities* section.

GRADUATE-LEVEL COURSES

All 500-level courses are open to qualified undergraduates with permission from the instructor. For course descriptions, please refer to the *Graduate Catalog*.

ELED 502: 3 s.h.

Education in Today's Elementary School

Offered annually.

ELED 505: 3 s.h.

Creative Activities in the Elementary School

Offered summer.

ELED 519: 3 s.h.

Seminar in Early Childhood Education

Offered periodically.

ELED 533: 3 s.h.

Nonfiction Literature and Literacy

Offered periodically.

EDUC 535: 3 s.h.**Literature for Children and Young Adolescents**

Offered periodically.

EDUC 536: 3 s.h.**Picture Book Communication**

Offered infrequently.

EDUC 561: 3 s.h.**Second Language Acquisition: Theory, Programs and Assessment**

Offered annually.

EDUC 562: 3 s.h.**Methods for Teaching English Language Learners**

Offered annually.

EDUC 563: 3 s.h.**Linguistic and Cultural Diversity in the Classroom**

Offered annually.

EDUC 564: 3 s.h.**Current Trends and Policies in the Teaching of English Language Learners: Seminar and Community Service**

Offered annually.

EDUC 575: 3 s.h.**Current Trends in Education**

Offered infrequently.

EDUC 586-589: 3 s.h.**Topics in Education**

Offered periodically.

EARTH SCIENCES

College of Science and Technology

Professor Clark, chairperson

Professors DeCaria, Marquez, Sikora, Yalda

Associate Professors Earman, Kumar, Vaillancourt

Assistant Professor Hagelgans

The Department of Earth Sciences offers programs of study leading to the following degrees: Bachelor of Science in geology; Bachelor of Science in meteorology; Bachelor of Science in ocean sciences and coastal studies, with an option in physical oceanography; Bachelor of Arts in the earth sciences, with an option in environmental geology; and Bachelor of Science in Education (B.S.Ed.) in earth sciences, with secondary education certification in earth and space sciences.

The Bachelor of Science programs in meteorology, geology, and ocean sciences and coastal studies, with an option in physical oceanography, are intended to prepare students for admission to graduate school or for professional employment upon graduation. The B.S. in meteorology conforms to the American Meteorological Society's guidelines and the GS-1340 requirements of the National Weather Service.

The Bachelor of Arts degree in earth sciences is designed to meet the needs of students who want exposure to all of the earth sciences and may want to find employment in an environmental field or return for teaching certification. However, by selecting additional appropriate courses as electives, it is possible for these graduates to meet the admission requirements of graduate schools in one of the earth sciences.

The program leading to the Bachelor of Science degree in education in earth sciences with secondary education certification prepares students for teaching careers in the secondary schools. The core of the curriculum provides a sound education in the traditional earth sciences areas of oceanography, meteorology, geology and astronomy. Completion of this curriculum leads to certification in earth and space science. In addition, graduates may teach general science.

Internships and cooperative education programs in the earth sciences provide opportunities for majors to apply knowledge gained in the classroom to the challenges of professional employment. In addition, the department has a set of skills courses in GIS, Advanced Weather Analysis and Forecasting Practicum, and Broadcast Meteorology with Studio for students wanting to develop proficiencies in these areas.

Millersville University is a founding member and full senior partner of the Chincoteague Bay Field Station (CBFS) at the Marine Science Consortium, and the earth sciences department actively participates in this program. Several ocean sciences and coastal studies courses are available through the CBFS. In particular, one course required in the oceanography major (Field Methods in Oceanography) must be taken through the CBFS at Wallops Island, Virginia. For more information, see *CBFS* in the *Special Academic Opportunities* section.

The Department of Earth Sciences is a member of the University Corporation for Atmospheric Research, is an institutional member of the American Meteorological Society and a corporate member of the National Weather Association and the Mid-Atlantic Regional Association Coastal Observing System. For more information, see www.millersville.edu/esci.

COURSE REQUIREMENTS

Earth Sciences Major (B.A.): 120 s.h.

ESCI 221, 241, 261, plus 18 s.h. in one or more earth sciences disciplines (geology, meteorology or oceanography) at the 200 level or higher, as approved by advisor. Required related courses: CHEM 111, 112; PHYS 131, 132; MATH 161, 235.

Earth Sciences Major (B.A.): 120 s.h.

Environmental Geology Option

ESCI 221, 222, 227, 321, 326, 328, 426, plus 3-8 s.h. of earth sciences electives. Required related courses: CHEM 111, 112; PHYS 131, 132; MATH 161, 235; completion of approved minor.

Geology Major (B.S.): 120 s.h.

ESCI 221, 222, 227, 321, 326, 328, 421, 423. Choose 6 s.h. from ESCI 225, ESCI 281 or GEOG 295, 322, 329, 422, 426, 428 or 429. Required related courses: MATH 161, 211, 235 or 333; PHYS 231, 232; CHEM 111, 112. Also choose additional 15 s.h. of science electives.

Meteorology Major (B.S.): 120 s.h.

ESCI 241, 282, 340, 341, 342, 343, 386 or 281, 441, 443, 444, 446. Choose 4 from ESCI 261, 322, 344, 347, 349, 364, 380, 390, 440, 445, 447, 448, 449, 485. Required related courses: CHEM 111; MATH 161, 211, 311, 235 or 333, 365; PHYS 231, 232.

Ocean Sciences and Coastal Studies Major (B.S.): 120 s.h.

ESCI 241, 261, 267*, 362*, 363, 366, 369, 380, 464, 465*, 468 (*available only at Wallops Island). Required related courses: MATH 161, 235 or BIOL 375; CHEM 111, 112; BIOL 211, 221; PHYS 131, 132 or 231, 232. Also choose additional 11-13 s.h. of electives from earth sciences, biology, chemistry, mathematics or physics that apply towards a major in that department.

Ocean Sciences and Coastal Studies Major (B.S.): 120 s.h.

Physical Oceanography Option

ESCI 241, 261, 267, 282, 363, 369, 380, 443, 467, 468, 485. PHYS 395 and MATH 467 are highly recommended. Required related courses: CHEM 111, 112; MATH 161, 211, 311, 365; PHYS 231, 232, 311 or ESCI 342, PHYS 312 or ESCI 343, PHYS 334 or ESCI 341.

Earth Sciences (Education) Major (B.S.Ed.): 126 s.h.

Certification in Secondary Education

ESCI 221, 222, 241, 245, 261, 366, plus ESCI 202 or 428. Required related courses: BIOL 241; CHEM 111, 112; MATH 160, 161; PHYS 131, 132, 117 or 317; EDFN 211, 241, 330; EDSE 321, 435, 461. Demonstrated competency in BIOL 100 is required. Refer to *Admission to Advanced Professional Studies and Certification* (education majors) in this catalog for more information.

Geology Minor

Track 1 - Required for BSE earth sciences majors. ESCI 221, plus 9 s.h. of geology coursework at the 200, 300 and/or 400 level; at least 6 credits must be taken at the 300 level or higher for the electives courses. Total 19 s.h.

Track 2 - Requirements for all other majors. ESCI 221, 222, plus 6 s.h. of geology coursework at the 200, 300 and/or 400 level; at least 6 credits must be taken at the 300 level or higher for the electives courses. Total 20 s.h.

Meteorology Minor

ESCI 241, 340, 341, 342, plus 6 s.h. of electives from ESCI 34_, 44_ or ESCI 385, 485. Total 19 s.h.

Oceanography Minor

ESCI 261; two from ESCI 362, 363, 369, 465; two from ESCI 267, 282, 380, 386; one from ESCI 366, 385, 445, 485. Total 19 s.h.

Earth Sciences Minor

ESCI 221, 241, 261, plus ESCI 32_ or 42_ (geology choice), ESCI 36_ or 46_ (oceanography choice), ESCI 34_ or 44_ (meteorology choice). Total 21 s.h.

Heliophysics and Space Weather Minor

PHYS 233, PHYS 321, PHYS 322; ESCI 341 or PHYS 334; PHYS 335, ESCI 440; PHYS 435 recommended. Total 18 s.h.

COURSE DESCRIPTIONS

Introductory Courses

ESCI 101: 3 s.h.

Earth Systems and Natural Hazards (G2)

The scientific understanding of earth systems as the causes of natural disasters, such as earthquakes, volcanoes, landslides, hurricanes, tornadoes, floods and tsunamis. 3 hrs. lec. Does not count toward any ESCI major. Offered periodically and periodically online in summer and winter.

ESCI 102: 3 s.h.

Origin and Evolution of the Earth (G2)

The origin and evolutionary development of the universe, solar system and planet Earth. Geophysical behavior of the solid earth, including volcanism, mountain building and other manifestations of the earth's dynamic interior. 3 hrs. lec. Does not count toward any ESCI major. Offered periodically and periodically online in summer and winter.

ESCI 103: 3 s.h.

The Science of Evolution (G2)

Evolutionary theory through an integrated perspective of both biology and geology. 3 hrs. lec. No credit for biology and earth sciences majors. Prereq: 15 credit hours recommended. Offered periodically.

ESCI 104: 3 s.h.

The World Ocean (G2)

A broad overview of the biological, chemical, geological and physical characteristics of the ocean, and the importance of the oceans to mankind and the environment. Does not count toward any ESCI major. 3 hrs. lec. Offered fall, spring and online in summer and winter.

ESCI 105: 1 s.h.

World Ocean Laboratory (G2, L taken concurrently with ESCI 104)

Methods and techniques used in the marine sciences, including introduction to navigation, plotting and evaluation of data pertaining to salinity, temperature, dissolved oxygen, primary productivity and current velocity. 2 hrs. lab. Optional field trip. Mandatory coreq: ESCI 104. ESCI 104/105 together constitute a single laboratory course in earth sciences for purposes of the general education curriculum. Does not count toward any earth sciences major. Offered fall, spring and periodically in summer.

ESCI 107: 3 s.h.

The Atmosphere (G2)

Origin and evolution of the atmosphere; solar and terrestrial radiation; horizontal and vertical structure of the atmosphere; temperature, pressure and water in the air; vertical motion; cloud formation and cloud type; circulation systems, severe weather, climate and climate change. 3 hrs. lec. Does not count toward any earth sciences major. Offered fall, spring and online in summer and winter.

ESCI 109: 4 s.h.

The Atmosphere with Laboratory (G2, L)

Origin and evolution of the atmosphere; solar and terrestrial radiation; horizontal and vertical structure of the atmosphere; temperature, pressure and water in the air; vertical motion; cloud formation and cloud type; circulation systems, severe weather, climate and climate change. 3 hrs. lec., 2 hrs. lab. Does not count toward any earth sciences major. Offered fall, spring and online in summer and winter.

ESCI 120: 3 s.h.

Environmental Geology (G2 taken concurrently with ESCI 121)

Exploration of earth systems and their relation to society, with focus on natural hazards and natural resources. Does not count toward any ESCI major. 3 hrs. lec. Offered fall, spring and periodically in summer.

ESCI 121: 1 s.h.

Environmental Geology Laboratory (G2, L taken concurrently with ESCI 120)

Laboratory exploration of earth system impacts on society, and human influences on Earth. Mandatory coreq: ESCI 120. ESCI 120/121 taken concurrently constitute a single laboratory course in earth sciences for purposes of the general education curriculum. Does not count toward an ESCI major. 2 hrs. lab. Offered fall, spring and periodically in summer.

ESCI 202: 3 s.h.

The Earth in Space (G2)

A scientific experience directed toward an understanding of the dynamic earth, its origin and evolution, and its place in the universe. Physical concepts from classical and modern physics, astronomy, cosmology, and the earth and atmospheric sciences, couched in the language of algebra, supported by observation, experiment and theory. 3 hrs. lec. Offered periodically. Prereq: MATH 101 with C- or higher or MPT 151 with C- or higher, or MATH 151 or MATH 161 or MATH 163 or MATH 204 (151, 161, 163, 204, grade of C- or higher), or permission of instructor.

Geology

ESCI 221: 4 s.h.

Physical Geology (G2, L)

The nature and distribution of materials of the solid earth—the dynamic processes by which they are formed and modified, and the character of resulting geologic structures. 3 hrs. lec., 2 hrs. lab. Offered fall, spring and periodically in summer. Prereq: MATH 101 (College Algebra) with a grade of C- or higher, or math placement into MATH 160 or higher.

ESCI 222: 4 s.h.

Historical Geology (G2, L)

Methods of interpreting the geologic rock record, chronologic study of earth history and study of fossils as records of ancient life. Emphasis on the history of North America. 3 hrs. lec., 2 hrs. lab, field trips required. Offered spring. Prereq: C- or higher in ESCI 221.

ESCI 225: 3 s.h.

Geomorphology

Processes of landscape development in theory and in the context of the regional geomorphology of North America. 3 hrs. lec. Offered fall of odd years. Prereq: C- or higher in ESCI 221.

ESCI 227: 4 s.h.

Mineralogy

Identification, crystal chemistry, crystallography and occurrence of common minerals; optical theory and interaction of light with crystals; mineral identification through use of transmitted polarized light. 3 hrs. lec., 2 hrs. lab. Offered fall of odd years. Prereq: C- or higher in ESCI 221; Prereq or Coreq: CHEM 112.

ESCI 321: 3 s.h.

Structural Geology

Recognition, interpretation and illustration of geological structures; kinematic and dynamic analysis of rock deformation; stress, strain and deformation mechanisms. 2 hrs. lec., 3 hrs. lab., field trips required. Offered fall of even years. Prereq: C- or higher in ESCI 222 and MATH 160 and PHYS 131 or 231.

ESCI 322: 3 s.h.

Environmental Hydrology

Theory and practice of quantifying hydrologic phenomena; field methods, data manipulation and environmental applications. 2 hrs. lec., 2 hrs. lab. Offered fall of even years. Prereq: C- or higher in ESCI 221 or ESCI 241 or GEOG 230, and MPT 160 or MATH 160.

ESCI 326: 4 s.h.

Sedimentation and Stratigraphy

The origin and composition of sediments and sedimentary rocks, study of the processes involved in the sedimentary cycle, environments of deposition, and the interpretation of ancient environments from sedimentary rocks. 3 hrs. lec., 2 hrs. lab., field trips required. Offered spring of odd years. Prereq: C- or higher in ESCI 222.

ESCI 328: 4 s.h.

Petrography/Igneous and Metamorphic Petrology (W)

Optical characteristics and identification of igneous and metamorphic rocks; petrogenesis of igneous and metamorphic rocks; introductory thermodynamics and phase equilibria as applied to igneous and metamorphic systems. 3 hrs. lec., 2 hrs. lab. Offered spring of even years. Prereq: C- or higher in ESCI 227; ENGL 110.

ESCI 329: 3 s.h.

Aqueous Geochemistry (W)

Inorganic chemistry of surface waters; equilibrium thermodynamics, solubility, stability relationships of silicates and calcium carbonates; kinetics, acid-base reactions, redox equilibria; contaminants transport in natural waters; surficial materials weathering. 3 hrs. lec. Offered fall of odd years. Prereq: ESCI 221, CHEM 112; ENGL 110.

ESCI 421: 3 s.h.

Advanced Geology (W)

A capstone course for geology majors with in-depth discussion of current geological research incorporating approaches from multiple geological subdisciplines. Synthesis and integration of knowledge through student-led exploration of current developments in geology. Combination of lecture and seminar, with students responsible for interpreting and discussing pertinent geological research, including the role of science in society. 3 hrs. lec. Prereq: ENGL 110, ESCI 321, ESCI 326 or ESCI 328, ESCI 423; open only to geology majors with senior status. Offered spring. Coreq: ESCI 326 or ESCI 328.

ESCI 422: 3-6 s.h.

Geological Field Mapping

Examination and interpretation of geologic materials and structures in the field. Students prepare a geologic map, stratigraphic column and structural cross-sections of an assigned field area. Offered infrequently. Prereq: C- or higher in ESCI 321.

ESCI 423: 3 s.h.

Applied Geophysics

Geophysical methods applied to environmental assessment, resource exploration and civil engineering issues. Topics covered include seismic refraction and reflection, electrical resistivity, gravity and geomagnetism. 2 hrs. lec., 2 hrs. lab. Offered fall of even years. Prereq: C- or higher in ESCI 221 and PHYS 232 or PHYS 132 and MATH 161.

ESCI 426: 3 s.h.

Groundwater Geology

Occurrence, quality and extraction of groundwater; lithologic and structural characteristics of aquifers; elementary theory of wells and groundwater flow. 2 hrs. lec., 2 hrs. lab. Offered spring of odd years. Prereq: C- or higher in ESCI 221, MATH 161.

ESCI 428: 3 s.h.

Planetary Geology (W)

Terrestrial geology in the context of the solar system; geochemical evolution of the solar nebula; planetary formation and evolution; comparative planetology, meteoritics; asteroid/cometary impact phenomena. 3 hrs. lec. Offered infrequently. Prereq: ENGL 110, ESCI 222 and CHEM 111.

ESCI 429: 3 s.h.

Weathering Systems Science

Principles of the geological, meteorological, chemical, biological and physical processes that transform bedrock into soil; rock and mineral weathering as a component of pedogenesis geomorphology, biogeochemical cycling, hydrology, tectonics, anthropogenic activities and global climate. Offered periodically. Prereq: C- or higher in CHEM 112, MATH 161 and 60 credit hours.

Meteorology

ESCI 241: 4 s.h.

Meteorology (G2, L)

Atmospheric structure and motions; physics of weather processes; weather and motion systems. 3 hrs. lec., 2 hrs. lab. Offered fall and as needed in spring. Coreq or Prereq: C- or higher in MATH 161 or 163, and PHYS 131 or 231.

ESCI 245: 3 s.h.

Environmental Meteorology (G2, L)

Practical meteorological problems in air pollution, atmospheric experimentation and other aspects of the human environment. Instrumentation and data analysis methods in applied meteorology. 2 hrs. lec., 2 hrs. lab. Offered spring and online in summer. Prereq: C- or higher in MATH 110 or 160 or 161 or 163H.

ESCI 340: 3 s.h.

Physical Meteorology

Distribution of meteorological variables in the atmosphere; governing principles in atmospheric science (gas laws, hydrostatic equilibrium, diffusion, conservation of energy, mass and momentum); radiative transfer, cloud processes and atmospheric electrification. 3 hrs. lec. Offered spring. Prereq: C- or higher in ESCI 241 or PHYS 231. Coreq or Prereq: MATH 311.

ESCI 341: 3 s.h.

Atmospheric Thermodynamics

First and second principles of thermodynamics, water-air systems, equilibrium of small droplets and crystals, thermodynamic processes in the atmosphere, atmospheric statics, vertical stability and aerological diagrams. 3 hrs. lec. Offered fall. Prereq: C- or higher in ESCI 241. Coreq or Prereq: MATH 311.

ESCI 342 3 s.h.**Atmospheric Dynamics I**

Meteorological coordinate systems; equations of motion; geostrophic, gradient and thermal winds; kinematics; circulation, vorticity and divergence theorems. 3 hrs. lec. Offered fall. Prereq: C- or higher in ESCI 241. Coreq or Prereq: MATH 311.

ESCI 343: 3 s.h.**Atmospheric Dynamics II**

Diagnostics equations, viscosity and turbulence; energy equations and transformations; numerical weather prediction; general circulation. 3 hrs. lec. Offered spring. Prereq: C- or higher in ESCI 342.

ESCI 344: 3 s.h.**Tropical Meteorology**

General circulation of the tropics; energy balance; boundary layer; cumulus convection; survey of tropical disturbances, including tropical cyclones. 3 hrs. lec. Offered fall of odd years. Prereq: C- or higher in ESCI 341, 342.

ESCI 347: 3 s.h.**Satellite Meteorology**

Orbital and radiative transfer physics applied to satellite meteorology systems. Contemporary applications of satellite remote sensing of the atmosphere, including the retrieval of cloud microphysics and precipitation, the generation of atmospheric vertical profiles of temperature and moisture, the retrieval of wind, and image interpretation in the context of weather forecasting. 3 hrs. lec. Offered fall of even years. Prereq: ESCI 241; MATH 161 or MATH 163.

ESCI 348: 2 s.h.**Broadcast Meteorology**

Preparation and presentation of weather information to the public; graphics preparation, television and radio weathercasting; video production. 1 hr. lec., 2 hrs. studio. Offered spring of odd years. Prereq: C- or higher in ESCI 241 or COMM 320.

ESCI 349: 3 s.h.**Chemistry of the Atmosphere (P)**

Theory, application, methods of analysis and instrumentation relevant to a study of the chemistry of the atmosphere. 3 hrs. of integrated lecture/lab/working group activities. May be used as an elective in meteorology and environmental chemistry if not counted as "P" course. Offered fall of even years. Prereq: minimum of 36 credit hours; COMM 100, ENGL 110; junior status; CHEM 104 or CHEM 111; and PHYS 132 or PHYS 232.

ESCI 350: 3 s.h.**History of Meteorology (P, D)**

Overall intellectual and institutional development of meteorology from Aristotle to the present, with emphasis on the 20th century. Historical overviews of dynamic meteorology and numerical weather prediction, observational tools (the history of radar and satellites) and computational devices, cloud microphysics and dynamics, hurricanes, convective storms and climatology. Spotlights key scientists and their role in the advancement of atmospheric sciences. 3 hrs. lec. Prereq: ESCI 107 or 109, or ESCI 241; and HIST 101 or 102 or 106 or 340; COMM 100, ENGL 110 and junior status.

ESCI 440: 3 s.h.**Space Weather and Environment**

In-depth study of the space environment between the earth and sun; solar-terrestrial interactions; physics of the sun and space weather; observations, modeling and prediction of space weather events; effects on life, property and infrastructure. 3 hrs. lec. Offered spring of even years. Coreq: MATH 365; Prereq: ESCI 342 and either ESCI 340 or PHYS 233 or permission of instructor.

ESCI 441: 3 s.h.**Synoptic Meteorology Lecture-Laboratory**

Application of atmospheric dynamics and atmospheric physics to the theoretical and empirical investigation of mid-latitude synoptic-scale meteorological processes. Topics include the diagnosis of synoptic-scale vertical motions, the circulation at fronts and the life cycle of the extratropical cyclone. 3 hrs. lec., 3 hrs. lab. Offered fall. Prereq: ESCI 340, 341, 343.

ESCI 442: 2 s.h.**Advanced Weather Analysis and Forecasting Practicum**

Advanced synoptic and mesoscale weather analysis and forecasting skills. Students perform weather analysis exercises designed to complement the forecast process. Students prepare probabilistic meteorological forecasts and lead post-forecast discussions focused on lessons learned. 1 hr. lec., 2 hrs. lab. Offered spring. Prereq: C- or higher in ESCI 441 and one semester of Campus Weather Service or by permission of instructor. Coreq: ESCI 444.

ESCI 443: 3 s.h.**Climate Dynamics (W)**

A comprehensive treatment of the components of the climate system, feedback mechanisms and interactions; mean state of the climate system; a detailed and in-depth treatment of the earth-atmosphere radiation balance and general circulation; natural and anthropogenic forcings and their effect on the climate system; climate models; and the current state of climate-observing networks and model validation. 2 hrs. lec., 2 hrs. applications and analysis. Offered fall. Prereq: ESCI 343 or 369, ENGL 110.

ESCI 444: 4 s.h.**Mesoscale Meteorology**

Application of atmospheric dynamics and atmospheric physics to the theoretical and empirical investigation of mid-latitude mesoscale meteorological processes. Topics include atmospheric sounding analysis, pressure perturbations, mesoscale instabilities, the atmospheric boundary layer, air mass boundaries, convection initiation, organization of convection and tornadoes. 4 hrs. lec. Offered spring. Prereq: ESCI 441.

ESCI 445: 3 s.h.**Numerical Modeling of the Atmosphere and Oceans**

Methods and mathematical concepts of numerical weather and ocean prediction models. Students must be able to program in one of the following languages: Fortran, C++, or IDL. 3 hrs. lec. Offered spring of odd years. Prereq: ESCI 282 or CSCI 161. Coreq or Prereq: ESCI 343 or 365.

ESCI 446: 3 s.h.**Statistical Meteorology**

Frequency distributions, sampling theory, linear and multiple regression analysis, time series, space variations of meteorological variables, statistical weather forecasting, forecast verification. 3 hrs. lec. Offered fall. Prereq: C- or higher in MATH 235, 311.

ESCI 447: 3 s.h.**Meteorological Instrumentation, Measurement and Observing Systems (W)**

Devices and platforms used to gather meteorological data; methods of data acquisition, reduction, error analysis and quality assurance; description of instrumentation, measurement techniques, observing systems and their deployment. 2 hrs. lec., 2 hrs. lab. Offered fall of odd years. Prereq: ENGL 110, PHYS 232 and MATH 235.

ESCI 448: 3 s.h.**Boundary Layers and Turbulence**

Mean boundary layer characteristics; turbulence and its spectrum; governing equations for turbulent flow; prognostic equations for turbulent fluxes and variances; TKE; turbulence closure schemes; similarity theory; simulation techniques; convective and stable boundary layers; boundary layer clouds. 3 hrs. lec. Offered spring of odd years. Prereq: C- or higher in ESCI 342 and MATH 211.

ESCI 449: 3 s.h.**Radar Meteorology**

Algorithms used in the display and interpretation of weather radar data; theory of electromagnetic radiation, principles of radar operation, Doppler radar and interpretation techniques; wind velocity, rainfall rates and detection of individual cells, multiple cells and turbulence. 3 hrs. lec. Offered spring of even years. Prereq: C- or higher in ESCI 241, MATH 311. Coreq or Prereq: ESCI 342.

*Ocean Sciences and Coastal Studies***ESCI 261: 4 s.h.****Introduction to Oceanography (G2, L)**

Methods and techniques of oceanography; physical, chemical, biological and geological aspects of the oceans; unity of oceanographic science and its relationship to other environmental sciences. 3 hrs. lec., 2 hrs. lab. Overnight field trip required. Offered fall, spring. Prereq: C- or higher in MATH 151, MATH 155H, MATH 160, MATH 161 or MATH 163.

ESCI 267: 3 s.h.**Field Methods in Oceanography**

Work on board small research vessels in the dynamic marine environment; use and application of standard oceanographic instruments and sampling devices; opportunities for independent research. 1 hr. lec., 4 hrs. lab. Offered only in summer at the CBFS. Prereq: C- or higher in ESCI 261.

ESCI 362: 3 s.h.**Marine Geology**

Sedimentary and tectonic characteristics of the continental margins and deep ocean basins; principles and processes of sediment transport and deposition in the marine environment; applications of geophysical methods at sea; marine mineral resources. 3 hrs. lec. Offered only in summer of even years at the CBFS. Prereq: C- or higher in ESCI 261 or 221.

ESCI 363: 3 s.h.**Chemical Oceanography**

Oceanic chemical phenomena, including structure of water, salinity, sources and sinks of chemical constituents; chemical interactions at interfaces between hydrosphere and atmosphere, lithosphere and biosphere; geochemical processes at spreading centers; biogeochemical cycles of nutrients; applications of geochronology and tracers; the carbon-dioxide-carbonate system; origin and history of seawater; anthropogenic effects. 3 hrs. lec. Offered spring of odd years. Prereq: C- or higher in ESCI 261 and CHEM 112.

ESCI 366: 3 s.h.**Ocean Resources**

Actual and potential ocean resources and the feasibility of their exploitation; role of ocean science and engineering in accomplishing this; socio-economic and political issues affecting resources and conservation. 3 hrs. lec. Offered spring of even years. Prereq: C- or higher in ESCI 261.

ESCI 369: 3 s.h.**Physical Oceanography**

Physical properties of seawater; mass and energy budgets of the ocean; typical distribution of water characteristics, global balances; the conservation equations; equations of motion; fluid motion in rotating systems; conservation of vorticity; wind and thermohaline circulation; currents and eddies; wind-generated waves; tides and other waves. A required course for Ocean Sciences and Coastal Studies majors and elective for other earth sciences programs. Combination of lecture and laboratory exercises. 2 hrs. lec., 2 hrs. lab. Offered fall of odd years. Prereq: ESCI 261 or ESCI 241; MATH 161, PHYS 132 or PHYS 232.

ESCI 464: 3 s.h.**Ocean Ecosystems (W)**

Advanced ocean sciences course investigating the physical, chemical and biological characteristics of the major pelagic ocean biomes from the polar through equatorial regions of the world ocean. Emphasis will be on the important marine plankton functional groups and how their abundances and rates of production are controlled by the circulation patterns of the ocean, ocean turbulence, food web structure, density stratification, the supply of nutrients and the availability of sunlight, and water transparency. 3 hrs. lec. Offered fall of odd years. Prereq: ESCI 363 and ESCI 369 or permission of instructor.

ESCI 465 or BIOL 495: 3 s.h.**Biological Oceanography**

Physical, chemical and biological factors controlling plant and animal populations in the marine environment; methods of sampling, identification and analysis. 2 hrs. lec., 3 hrs. lab. Offered only during summer at the CBFS. Prereq: C- or higher in ESCI 261 and BIOL 211 and BIOL 221.

ESCI 468: 3 s.h.**Ocean Data Analysis and Presentation**

Advanced ocean sciences course covering the theory behind the most commonly used techniques of ocean sampling and the analysis and presentation of oceanographic data. Course will cover the meaning of data and the common types of oceanographic data, methods of ocean data collection, the meaning and importance of metadata, databases in ocean science community, the idea of geospatial data and the importance of frame of reference and time and space scales of interest, the variety of ways to analyze and present oceanographic data, and how to present data to maximize its informational content. 2 hrs. lec., 2 hrs. lab. Offered spring of even years. Prereq: ESCI 363 and 369 or permission of instructor.

*Courses for All Earth Sciences Majors***ESCI 281: 3 s.h.****GIS Applications for the Earth Sciences**

Introduction to the basic concepts of geospatial information systems (GIS) applications for earth sciences students. Emphasis is on the use of GIS applications for solving problems in the earth sciences. Limited to earth sciences majors or minors who have completed one of the introductory earth sciences courses for majors. ESCI 281 and GEOG 295 may not both be taken for credit. 3 hrs. lec. Offered fall of even years. Prereq: ESCI 221, 241 or 261.

ESCI 282: 3 s.h.**FORTTRAN Programming for Earth Sciences Applications**

Programming in computational methods emphasizing FORTRAN applied to the earth sciences; numerical solution of equations of motion; statistical properties of digital images; analysis of periodical phenomena; use of National Center for Atmospheric Research graphics library. 2 hrs. lec., 2 hrs. lab. Offered fall. Prereq: MATH 211 and PHYS 231.

ESCI 380: 3 s.h.**Remote Sensing and Image Interpretation**

Principles of remote sensing; fundamentals of image visualization; radiative transfer equation; use of environmental, meteorological and oceanographic satellites; satellite algorithm and parameter estimation; use of Environment for Visualizing Images (ENVI) software for image analysis and interpretation. Basic computer literacy is assumed. 2 hrs. lec., 2 hrs. lab. Research project is required. Offered spring of odd years. Prereq: ESCI 221 or 241 or 261.

ESCI 385: 3 s.h.**Global Climate Change: Science and Policy (P)**

Evolution of the earth's habitable atmosphere and oceans; mechanisms that control climate processes and change; past global climate change as deciphered through paleoclimatic and paleoceanographic methods; recent rapid climate fluctuations and possible future changes. 3 hrs. lec. Offered fall of odd years. Prereq: ESCI 221 or ESCI 241 or ESCI 261 or GEOG 230; MU Online Perspectives: COMM 100, ENGL 110 or ENGL 110H, and junior class standing.

ESCI 386: 3 s.h.**Scientific Programming, Analysis and Visualization**

Use of scientific programming languages for analysis and display of data. Topics include data types; syntax and control statement; use of plotting and graphics libraries; reading and writing data sets in ASCII, binary, NetCDF and other formats; spectral analysis; statistical operations; matrix operations. 2 hrs. lec., 2 hrs. lab. Offered spring. Prereq: ESCI 282 or CSCI 161; MATH 211 and PHYS 231.

ESCI 485: 3 s.h.**Air/Sea Interaction**

Physics of wind waves; turbulent fluxes at the air-sea interface; planetary boundary layers; low-frequency oceanic waves; storm surges; importance of the ocean for tropical climates; El-Niño-Southern Oscillation, monsoon circulations, tropical and extratropical cyclones. 3 hrs. lec. Offered spring of even years. Prereq: C- or higher in ESCI 342 or 369.

*Problems and Seminar***ESCI 390: 1-4 s.h.****Topics in the Earth Sciences**

Detailed investigation of a topic of current research interest. Topic to be announced each time course is offered. Credit and meeting hours are variable, depending on topic offered. Offered infrequently. Prereq: completion of 60 credits.

ESCI 497: 1 s.h.**Seminar in the Earth Sciences**

The interrelationships of the earth sciences disciplines as environmental sciences, viewed in the context of contemporary science. Offered infrequently. Prereq: completion of 60 credits.

ESCI 498: 1-3 s.h.**Independent Study in the Earth Sciences**

Supervised independent research in the earth sciences. Subject determined jointly by student and the problem supervisor. Permission of department chair and school dean required.

Honors Course

See *Honors* section of this catalog.

ECONOMICS

College of Arts, Humanities and Social Sciences

Associate Professor Smith, chairperson

Professors Gumpfer, Suliman

Associate Professors Baker, Madden, McPherson

The Department of Economics offers a B.A. degree in economics, with options in quantitative economics, financial economics and political economy.

Economics is the study of how a society is organized to produce and distribute material goods and services. It is a combination of technical knowledge of industry and commerce as well as a broad theoretical and practical understanding of major aspects of the economy.

The economics major requirement includes a basic core of courses in economic principles and theory. The student, in consultation with an advisor, may then select courses based on individual interest and the wide variety of career options available to economics majors.

As one of the crucial fields in the government, manufacturing and service sectors, economics will be an especially attractive field to help students prepare for a future career. By virtue of its broad nature, economics readily widens students' choices to join the workforce and/or pursue their graduate studies. Students who wish to join the workforce, attend law school or work toward advanced degrees in other applied areas are advised to choose the basic B.A. in economics, which emphasizes preparation in applied economics and data processing. Those who plan to do graduate studies in economics or business are advised to take the B.A. in economics—quantitative option, which offers more preparation in mathematics, statistics and theoretical economics. Students interested in government, politics and law may take the political economy option. Students interested in financial services and investments may take the financial economics option.

Potential areas of employment for economics students are diverse. They include the financial sector, government sector and manufacturing sector. The flexibility of the programs not only provides internship and cooperative education opportunities with local industry, but, with the proper advisement, also permits students to combine coursework with computer science, mathematics, social sciences, business, humanities, natural sciences and communication arts.

The economics minor program is intended to provide a background in economics to the student with a major in another field. The technical economics minor is intended to serve the needs of students from mathematics and the sciences who are interested in combining their degrees with economics and related areas and/or planning to pursue their graduate studies in economics and related areas. This minor is open to all interested students.

Students should consult the department for the most recent curriculum and career information.

COURSE REQUIREMENTS

Economics Major (B.A.)

Core course requirements for all liberal arts economics majors: ECON 101, 102, 215, 231, 318, 319, 488 and 12 additional credit hours in economics electives, plus one required related course (3-4 credit hours): MATH 151 or 161. Students may substitute a maximum of two selected business administration courses for elective courses in economics. Consult the economics department for a currently approved list.

Economics Major (B.A.)

Quantitative Option

Core course requirements: ECON 101, 102, 215, 231, 235, 318, 319, 333 and 488; 6 additional credit hours in economics electives and a minimum of two required related courses (6-8 credit hours); and MATH 151 or 161.

Economics Major (B.A.)

Financial Economics Option

Core course requirements: ECON 101, 102, 215, 231, 318, 319, 325 and 333; 6 additional credit hours in economics electives and 18 credit hours of required related courses: BUAD 161, 162, 341, 342, 345 and MATH 151 or 161.

Economics Major (B.A.)

Political Economy Option

Core course requirements: ECON 101, 102, 225, 231, 316, 318, 319 and 365; 12 additional credit hours in electives and 10 credit hours of required related courses, which must include one of the following: MATH 151 or 161; and two of the following: GOVT 111, 112, 205 and 241.

Social Studies Major (B.S.Ed.)

Certification in Secondary Education

This program is designed for students planning to teach economics, geography, government or history. The program consists of 30 s.h. of required core courses, 2 in economics, geography and government and 4 in history. In consultation with an academic advisor, each student will select a concentration totaling 30 s.h. from among the following disciplines: anthropology (0-6), economics (3-15), geography (3-15), government (3-15), history (3-15), psychology (0-6) and sociology (0-6); economics, geography and history courses should be at the 200 level or above. Students who concentrate in economics are highly encouraged to take 15 s.h. in economics. The program also consists of 27 s.h. of professional education courses, two math courses and two courses in the humanities or sciences that support the concentration.

Students wishing to teach anthropology, psychology or sociology in the secondary schools are required to complete the B.S.Ed. As part of that program, students should select a number of courses in anthropology, sociology and psychology to prepare for the certification exams in the social sciences. Additional courses beyond the social studies program may be necessary. Upon receiving certification,

students can take the test for Social Sciences Certification, which will allow them to teach anthropology, psychology and sociology. The professional education courses required are EDFN 211, 241 and 330; EDSE 321, 433 and 461.

Economics Minor: 18 s.h.

ECON 101, 102 and either ECON 318 or 319, plus three other courses in economics, including two 300–400-level courses.

Technical Economics Minor: 18 s.h.

ECON 101, 102, 235, 318, 319 and 333.

COURSE DESCRIPTIONS

ECON 100: 3 s.h.

Introductory Economics (G3)

Introduction to economics as a social science for nonmajors or students interested in taking ECON 101 or 102 who would like a preparatory course. Introduction to fundamental economic concepts, economic policy and global markets. Class activities and simulations complement an emphasis on current events. No credit towards an economics major or minor or BSE social studies major. Offered periodically.

ECON 101: 3 s.h.

Principles of Macroeconomics (G3)

Introduction to macroeconomic analysis concentrating on national income, price levels, employment, monetary policy and fiscal policy, with introductory analysis of the global economy. To be successful, it is recommended that students be proficient in algebra (the equivalent of successfully completing MATH 101 or MPT equivalent); however, MATH 101 is not a prerequisite. Offered fall, spring.

ECON 102: 3 s.h.

Principles of Microeconomics (G3)

Introduction to microeconomic analysis concentrating on consumer and producer behavior, competitive and other markets, public policy and government regulation. To be successful, it is recommended that students be proficient in algebra (the equivalent of successfully completing MATH 101 or MPT equivalent); however, MATH 101 is not a prerequisite. Offered fall, spring.

ECON 203: 3 s.h.

Introduction to the World Economy (G3)

An introductory course analyzing and comparing global economies, trade and economic development. This course does not count toward the major, but qualifies for the BSE social studies major and for the minor. MATH 101 or MPT equivalent is highly recommended prior to taking this course. Offered fall. Prereq: ECON 101 or 102.

ECON 207: 3 s.h.

Environmental Economics (G3, W)

Microeconomic theory applied to the problems of pollution and natural resource depletion. Topics include efficiency, externalities, public goods, benefit-cost analysis and environmental policy. Content includes economic analysis of current global, national, regional and local environmental problems. Offered fall. Prereq: ECON 102, ENGL 110.

ECON 215: 3 s.h.

Money, Credit and Banking (G3)

Survey of monetary and banking institutions, policies and practices, including study of monetary theory. Offered fall, occasionally in spring. Prereq: ECON 101.

ECON 225: 3 s.h.

Comparative Economic Systems (G3, W)

Analysis of economic systems in France, the former Yugoslavia, China, Japan, the United Kingdom, the former Soviet Union and the United States. Emphasis varies with each offering at the discretion of the instructor. Offered spring. Prereq: ECON 101, ENGL 110.

ECON 226: 3 s.h.

Area Studies (G3)

Analysis of regional economies such as Africa, Asia or Latin America. The area of study will be specified by the instructor expected to teach the course. Offered periodically. Prereq: ECON 101 or 102.

ECON 231: 3 s.h.

Applied Statistics I (G3)

Presentations of data, measures of central tendency and variation, and index numbers. Introduction to probability theory, sampling and inference, and regression and time series analysis. Offered fall, spring.

ECON 235: 3 s.h.

Mathematical Economics

Static analysis in economics, consumer and firm equilibrium, marginal analysis, optimization problems. Preliminary use of algebra and calculus for business and economic applications. Offered infrequently. Prereq: ECON 101, 102; MATH 101 or equivalent.

ECON 246: 3 s.h.

Economics of Health and Healthcare (G3)

Analysis of consumer theory, firm theory and market failure within the context of health economics. Emphasis on the institutions involved in healthcare provision, labor markets for healthcare professionals, and market structure and government regulation. Offered fall. Prereq: ECON 102.

ECON 305: 3 s.h.

Economics in Film (P)

This course explains economics and its links to history, political science, philosophy and sociology through film. It deals with finance, development,

labor history, political economy, conflict theory and other socioeconomic issues. The course utilizes film as a bridge between real economic life and scholarly treatment of the relevant issues. The course emphasizes critical thinking and synthesis of economic ideas. Students must participate in critical thought, questioning the obvious, exploring meaning and incisive analytical writing. Offered infrequently. Prereq: ECON 100 or 101 or 102; COMM 100; ENGL 110 and junior status.

ECON 310: 3 s.h.

The Economics of Justice (P)

Economic concepts and models are used to explain laws and legal situations. Economics is applied in some of the principal areas of the law: property, contracts, torts and crime. Offered infrequently. Prereq: ENGL 110, COMM 100, junior status, ECON 102, BUAD 202, or permission of instructor.

ECON 316: 3 s.h.

Public Finance (G3)

Economic aspects of governmental budgeting emphasizing fiscal policy, including impact of taxation and expenditures. Topics include the allocation, distribution and stabilization effects of the public household. Offered spring. Prereq: ECON 101, 102.

ECON 318: 3 s.h.

Intermediate Microeconomics (G3)

Similar in scope to ECON 102, with major emphasis on the further development and refinement of tools of economic analysis. Offered spring. Prereq: ECON 101, 102 and MATH 151 or 161.

ECON 319: 3 s.h.

Intermediate Macroeconomics (G3)

Similar in scope to 101, with major emphasis on the determination of the economy's total output, the price level and the level of employment. The course incorporates the interaction of the market for goods and services, the assets market and the labor market. Offered fall. Prereq: ECON 101.

ECON 323: 3 s.h.

Games and Experiments in Economics (G3, W)

This course presents how economic theory is used to explain decisions of economic agents (e.g., consumers, firms or the government) in markets and strategic environments where the outcomes depend on the interaction of the decisions of the agents. Tests of economic theory predictions in the form of laboratory experiments will also be discussed and implemented. The areas of study include market behavior under various institutional settings, allocation decisions in settings with externalities, and individual choice and uncertainty. Offered annually. Prereq: ECON 102 or 102H, and ENGL 110.

ECON 325: 3 s.h.

International Economics (G3)

Theory of international trade, commercial policy and trade in relation to economic development, balance of payments and the foreign exchange market, international monetary developments, foreign aid and economic growth. Offered spring. Prereq: ECON 101, 102.

ECON 326: 3 s.h.

Economic Growth and Development (G3, W)

Introduction to economic characteristics and problems of less developed economies, and to associated theories and policies. Offered annually. Prereq: ECON 101, 102; ENGL 110.

ECON 327: 3 s.h.

Women and Global Economic Development (P)

Theoretical and case-based examination of women in the political economy of "less developed" economies. Issues covered include women's experiences with economic development; effects of economic development on women's status, roles, workloads and resource access; effective methods of empowerment for women experiencing contemporary economic development; and targeting gender in development, particularly through grassroots efforts. Offered annually. Prereq: ECON 101 or 102, COMM 100, ENGL 110, junior status.

ECON 333: 3 s.h.

Econometrics

The estimation and hypothesis-testing of economic models, principally using regression techniques. Topics include linear models, time series analysis and simultaneous equations models. The uses and limitations of these models for economic forecasting are examined with the aid of computers. Offered spring. Prereq: ECON 101, 102 and either 231 or 332.

ECON 345: 3 s.h.

Labor Economics (G3)

The labor market and labor forces, theories of wages and employment, security, determinants of trade union policy and governmental manpower policies. Offered spring. Prereq: ECON 101, 102.

ECON 365: 3 s.h.

History of Economic Thought (G3)

Examination of a variety of theoretical and philosophical perspectives in economics developed during the past few hundred years. The ideas of well-known economists such as Adam Smith and Karl Marx are typically analyzed, as is the thought of a selection of lesser-known contributors to the discipline. Offered once every two years. Prereq: ECON 101, 102.

ECON 375: 3 s.h.

The Economics of Industrial Organization (G3)

The study of (1) how enterprises function within a variety of market structures and (2) how well the outcomes fit the public interest. Specific topics include market share, barriers, concentration, vertical power, economies of scale, pricing behavior, mergers and efficiency. Offered spring. Prereq: ECON 101 and 102.

ECON 488: 3 s.h.

Seminar in Economics (W)

Students participate in the process of knowledge creation by generating a research question in economics and undertaking in-depth analysis of that

question. The course is structured to support student development and application of critical analytical skills through theoretical and/or empirical methods, research and information management skills, and writing and presentation skills. The course emphasizes the process of research and writing, culminating in three final products: the paper, the poster and the presentation. Majors only. Offered annually. Prereq: ENGL 110, minimum 12 hours of economics or permission of instructor.

ECON 489, 499: Variable Credit (1-3 s.h.)

Honors Courses/Thesis

ECON 498: Variable Credit (1-3 s.h.)

Independent Study

For further information on independent study, see the *Special Academic Opportunities* section.

ECON 586, 686: 3 s.h.

Topics in Economics

EDUCATIONAL FOUNDATIONS

College of Education and Human Services

Associate Professor Mahoney, chairperson

Professors Deemer, Hanich, Herr

Associate Professors Dietrich, Dreon, Long, Mahoney, Neuville, Ward

Assistant Professors Brooks, Primus, Wright

Millersville University provides certification in secondary education in the following fields: biology, chemistry, citizenship, social studies, earth and space science, English, foreign languages (French, German, Spanish), mathematics and physics. PreK-12 certification is available in art education, technology education, public school nursing, music education and mentally/physically handicapped. The requirements for these programs are listed under the individual disciplines (see *Index*). For further information, contact the chairperson of the educational foundations department.

COURSE REQUIREMENTS

Secondary Education Certification (B.S.Ed.)

Requirements of the major field are listed under the individual discipline. Professional studies consist of:

1. The social and psychological foundations block, 6 s.h. (EDFN 211, EDFN 241 and an urban field experience);
2. The advanced professional studies bloc, 15 s.h. (EDFN 330, EDSE 321, EDSE 340, SPED 346); one subject-specific instructional methods course, includes a 150-hour field experience.
3. Student teaching 12 s.h. (EDXX 461 and EDSE 471).

Refer to *Admission to Advanced Professional Studies and Certification (Education Majors)* in this catalog for more information.

COURSE DESCRIPTIONS

EDFN 130: 3 s.h.

Technology in the Music Profession

Students explore the uses of technology and its application in the music classroom. Topics include computer basics, applications software, music hardware and software evaluation, music notation software, sequencing software, MIDI interface devices, telecommunications and multimedia presentation systems. Students are provided a series of hands-on experiences with hardware and software to develop the skills and competencies required of the music professional. No credit given if credit earned in EDFN 220, 230, 320/520, 330/530, 333/533 or EDAR 330/530. Offered fall, spring.

EDFN 211: 3 s.h.

Foundations of Modern Education (D)

This course provides an analysis of the philosophical, anthropological, sociological, economic and historical foundations for the contemporary PreK-12 school system in the United States; more specifically how issues of race, ethnicity, language, gender, disability, sexual orientation, geography, socioeconomic and religion influence the profession of teaching in particular grade-level contexts. The content for each section will be focused on the respective program area of the candidates (PreK-4 grades, 4-8 grades, and 7-12 grades). The course addresses the Pa. Dept. of Education's sociocultural standards for English-language learners. Must be taken simultaneously with EDFN 241. Includes field experience, which requires submission of satisfactory FBI, Act 34/151 clearances for eligibility for field placement.

EDFN 241: 3 s.h.

Psychological Foundations of Teaching

Teaching and learning through the application of psychology to the activities of the classroom. Learning theory and practice, human growth and development, motivation, classroom management, evaluation and principles of effective instruction. Must be taken simultaneously with EDFN 211. Includes field experience, which requires submission of satisfactory FBI, Act 34/151 clearances for eligibility for field placement.

EDFN 312: 3 s.h.

Women & Education: Socialization & Liberation (P)

This course uses philosophical analysis and a sociology-of-knowledge approach to examine women's and girls' experiences with respect to educational institutions as they exist in contemporary America. These concerns are explored dialectically, examining not only how educational institu-

tions and opportunities shape women, but also how the presence of women in educational activities alters the nature of that enterprise. Offered periodically. Prereq: COMM 100, ENGL 110, junior status.

EDFN 320/520: 3 s.h.

Instructional Technology in Elementary Education

Students use case studies to explore the uses of technology and its application in elementary education. Topics include computer basics, applications software, curriculum integration, evaluation of educational software, telecommunications and multimedia presentation systems. Students are provided a series of hands-on experiences with hardware and software to develop the skills and competencies required of the elementary education teacher. Offered fall, spring. No credit given if credit earned in EDFN 130, 220, 230, 330/530, 333/533 or EDAR 330/530.

EDSE 321/521: 3 s.h.

Issues in Secondary Education

Examines the role of the secondary teacher, issues encountered in the classroom and classroom interactions. Includes field experiences. Offered fall, spring. Prereq: EDFN 211, 241. Admission to Advanced Professional Studies. Must be taken simultaneously with professional block. Professional block field experience includes approximately 150 hours in schools.

EDFN 330/530: 3 s.h.

Instructional Technology, Design and Assessment

Instructional design and assessment will be used as a basis for planning and evaluating the use of technology for student-centered teaching and learning within specific disciplines. Offered fall, spring. Admission to Advanced Professional Studies. No credit given if credit earned in EDFN 130, 220, 230, 320/520 or EDAR 330/530. Taken with professional block. Professional block field experience includes approximately 150 hours in schools.

EDSE 340: 3 s.h.

Content Area Literacy for Diverse Classrooms

Students are offered opportunities to explore research-based strategies for effectively teaching in inclusive multilingual settings. Instructional best practices will be presented as they relate to differentiating instruction for the plethora of diverse needs in modern-day classrooms. There will be a strong focus on exploring and reflecting on methods that are aimed at helping students gain proficiency in reading and writing as a means of accessing and interacting with the curriculum. Assessment will be explored, as it offers critical insights for informed and targeted decision making. Admission to Advanced Professional Studies. Taken with professional block. Professional block field experience includes approximately 150 hours in schools.

EDFN 355: 3 s.h.

Living Online: Youth Conflict, Agency and Identity on Social Media (D, P)

Using social media as a platform and site of inquiry, examines the context and social impact national and international events, ideas and movements have had on adolescent cyber communities. Studies social theorists, technology gurus, public policy makers and youth participants who continue to grapple with the ever-changing landscape of social media in a vastly diverse nation and world. Prereq: ENGL 110/110H; COMM 100/100H; 60 credits; limited to 50% BSE students.

EDFN 376: 3 s.h.

Whose School Is It Anyway? The Struggle for Equity in American Schooling (D, P)

Historical, political and legal investigation of American public schooling in the 19th and 20th centuries and of the issue of equal educational opportunity in regard to gender, class, race and ethnicity. Students should have completed a lower-level history, historiography, political science or educational history course. Offered periodically. Prereq: COMM 100, ENGL 110, junior status.

EDFN 386, 387, 388: 1-6 s.h.

Topics in Educational Foundations

Detailed investigation of a topic of current interest. Topic to be announced each time course is offered. Credit and meeting hours are variable, depending on topic offered. May be taken more than once for credit as topic varies. Offered periodically.

EDFN 398: 3 s.h.

Urban Immersion Seminar (P)

Intensive living-learning experience based in an urban setting. On-site experience in urban schools and social service agencies is provided as well as service-learning experiences within the urban community. Professional development geared to developing the skills and knowledge base needed to work effectively in urban communities will be available. Course portfolio tailored to student's area of interest/major is required. Offered summer. Prereq: COMM 100, ENGL 110 and junior status.

EDSE 433: 3 s.h.

Teaching of Social Studies

Consideration of the goals of social studies in secondary schools; materials, instructional methods and strategies; recent developments; and field experiences. Offered fall, spring. Prereq: EDFN 211, 241. Admission to Advanced Professional Studies. Taken with professional block. Professional block field experience includes approximately 150 hours in schools.

EDSE 435: 3 s.h.

Teaching of Science in Secondary Schools

Current initiatives in science education; state standards in science/technology and environment/ecology, creativity, effective demonstrations, lab work and short/long-range planning. Opportunities for realistic teaching and field experiences. Offered only in fall. Prereq: EDFN 211, 241. Admission to Advanced Professional Studies. Taken with professional block. Professional block field experience includes approximately 150 hours in schools.

EDXX 461: 9 s.h.

Student Teaching

Student teachers are assigned full-time to cooperating teachers in schools and University supervisors to gain experience in the total activities of the teacher. Seventh or eighth semester. Offered fall, spring. Prereq: EDFN 211, 241, EDSE 321, EDFN 330 and EDSE 433 or 435 or one of the following: ENGL 485, FORL 480, MATH 405, and specifically SPED 346 and EDSE 340. Admission to Advanced Professional Studies. (See *Academic Policies: Student Teaching, Application and Eligibility: Student Teaching, Transfer Students.*)

EDSE 471: 3 s.h.**Differentiating Instruction in the Classroom**

Taken in conjunction with EDXX 461 (Student Teaching), this course is for all secondary content and PreK-12 BSE programs. Course will provide teacher candidates with the ability to develop and apply their knowledge, skills and dispositions in accommodating instruction for English-language learners and students with disabilities. Candidates will design, implement and assess intervention plans and differentiated instruction techniques according to established federal mandates and state standards. Candidate will demonstrate sensitivity and competence in adapting lesson plans, addressing literacy in content area courses, modifying assessment, helping students acquire academic language, contributing in multidisciplinary teams and co-teaching. Prereq: completion of professional block and specifically SPED 346 and EDSE 340. Coreq: enrollment in EDXX 461.

EDFN 489, 499: 1-4 s.h.**Departmental Honors in Educational Foundations**

Two to four semesters of supervised research by highly motivated students capable of conducting independent research projects. Prereq: 3.0 GPA and recommendation by faculty mentor. For further information, see the *Special Academic Opportunities* section.

EDFN 498: 1-3 s.h.**Independent Study in Educational Foundations**

For further information, see the *Special Academic Opportunities* section.

SPED 237: 3 s.h.**Applied Foundations of Contemporary Special Education**

This course identifies the complex sociocultural history that has brought us to where we are in special education practice today. It presents the contemporary and historical influences of the American school system and how special education is integrated into the modern classroom. The overrepresentation of economically disadvantaged and culturally and linguistically diverse populations in special education is explored through careful consideration of cultural collaboration, current sociological variables and analysis of causes and prevention strategies. Individual learning differences and the development of academic and functional performance needs of students with disabilities are considered historically, legally, educationally, culturally and socially. Offered fall, spring, summer. Prereq: FBI, Act 34/151 clearances, TB test. Coreq: Field experience; ECSP majors: EDFN 211, EDFN 241, ERCH 225; INED students: EDFN 211, EDFN 241.

SPED 328: 3 s.h.**Formal and Informal Assessment in Special Education**

The administration, scoring and interpretation of assessment devices typically used in psychometric evaluations are stressed. Critical evaluation of such devices in terms of reliability, validity and norming groups is also developed. The integration of the interpretive results of psychometric evaluation with behavioral observation, task analysis and other types developed in prerequisite courses is demonstrated. Offered fall, spring. Prereq: admission to Advanced Professional Studies.

SPED 330: 3 s.h.**People with Disabilities: Social Discrimination and Oppression—The Social, Political and Cultural Realities of Living as a Person with a Disability (D, P)**

Examines social discrimination through consideration of the policies and practices of societies. Creates an understanding of the social, political and cultural, rather than the physical or psychological, determinants of the experience of disability. Disentangles impairments from the myths, ideology and stigma that influence social interaction and social policy. Through course content and activities, students will challenge the idea that the economic and social statuses and the assigned roles of people with disabilities are the inevitable outcomes of their condition. Offered fall, spring, summer. Prereq: COMM 100, ENGL 110 and junior status.

SPED 346: 3 s.h.**Secondary Students with Disabilities in Inclusive Settings: Educational and Social Implications**

This course is designated to prepare secondary education majors to effectively teach students with disabilities in inclusive classrooms. Participants will learn legal mandates, secondary general educators' role in the special education process, and the academic and social implications of inclusion. Participants also will learn to facilitate academic achievement for students with mild and moderate disabilities in inclusive secondary education by planning, adapting and implementing effective instruction. Offered fall, spring. Prereq: required submission of satisfactory FBI, Act 34/151 clearances; EDFN 211, 241; admission to Advanced Professional Studies.

SPED 432: 3 s.h.**Curriculum and Methods for Students with Mild/Moderate Disabilities**

This course is designed to develop competencies to identify curriculum content and implement effective methodologies needed to direct the education program for students with disabilities in the secondary classroom setting. Offered fall, spring. Prereq: admission to Advanced Professional Studies.

SPED 434: 3 s.h.**Secondary Programming and Transition Planning for Youth with Disabilities**

This course is intended to develop competencies for individual program planning and instructional management. It prepares students to develop strategies to deliver curriculum in inclusive environments through the Individualized Education Program (IEP). The transition components of the IEP will be emphasized to prepare secondary teachers to understand their role in developing goals, planning and selecting options for postsecondary education, employment and independent living goals for youth with disabilities. Offered periodically. Prereq: admission to Advanced Professional Studies.

Urban Education Program. 15-18 s.h.

The Urban Education Program provides students with the opportunity to have an overall understanding of urban communities, urban children and urban school teaching. The intensive part of the program is for one semester during the sophomore year.

If you have already taken EDFN 211 and 241, you do NOT qualify for the Urban Education Program.

ENGINEERING

See Applied Engineering, Safety & Technology and Physics

ENGLISH

College of Arts, Humanities and Social Sciences

Professor Craven, chairperson

Associate Professor Corkery, assistant chairperson

Professors Carballo, Halden-Sullivan, T. Miller, Sheaffer

Associate Professors Duncan, Farkas, Jakubiak, Mayers, McCollum-Clark, Shea

Assistant Professors Archibald, Ording, Rineer, Rosenthal, Shin, Widmayer, Zhang

Instructor Anderson

English majors may pursue a B.A. or B.S.Ed. degree.

Required 100-level and 200-level major courses must be completed by the end of the sophomore year. Liberal arts majors must complete ENGL 110, 220, 233, 231 (or 241H) or 235, 237 and 311 with a minimum ENGL GPA of 2.0. Secondary education majors must complete ENGL 110, 220, 231 or 232 (or 241H), 233 or 235, 237, 311 and 321 with a minimum ENGL GPA of 2.0. ENGL 220 and ENGL 237 must be completed before English majors may enroll in 400-level courses, unless the department chairperson sanctions concurrent enrollment in lower- and upper-division courses.

A total of 42 credit hours in English (which includes ENGL 311) are required for graduation.

All B.A. students must complete a minor. Students also may elect to pursue options in Comparative Literature, English as a Second Language, Film Studies, Linguistics, Journalism and Writing Studies.

Internships provide opportunities for English majors to apply their field of study in professional contexts. Consult your advisor or the Office of Experiential Learning and Career Management (ELCM) for more information on internships.

The department participates in the pre-law advisory committee of the College of Arts and Humanities and Social Sciences. English majors planning careers in law should contact the department's pre-law advisor, Dr. Jill Craven.

In planning a course of study, English majors must consult with their departmental academic advisors on a regular basis, because major revisions in programs of study offered in whole or in part by the English department may occur to modify or expand existing requirements.

The English Department houses many of the courses for the MDST Digital Journalism curriculum. Talk to Dr. Jill Craven or Dr. Caleb Corkery if interested in the Digital Journalism or Sports Journalism MDST degrees .

COURSE REQUIREMENTS

English Major (B.A.): 120 s.h.

ENGL 220, 233, 231 or 241H or 235, 237, 311, 405; 3 s.h. of literature (400 level) prior to 1800; 3 s.h. of literature (400 level) after 1800; 3 s.h. of a literary genre (400 level); 3 s.h. in American literature (400 level); 12 s.h. of English electives.

A minor should be declared by the end of the sophomore year (before the completion of 60 credits) in consultation with a department advisor. See the beginning of the *Academic Programs* section for a listing of currently approved minors.

English Major (B.S.Ed.): 120 s.h.

Certification in Secondary Education

ENGL 220; 231 or 233 or 235; 232 or 234 or 236; 237; 240 or 481; 242; 311; 321; 336; 405; 486; 487; 488; 3 s.h. of American literature (400 level); 12 s.h. of English electives (including one 400-level and one P course). Required related courses: EDFN 211, 241 and 330; EDSE 321, 340, 461 and 471; SPED 346.

At least one required or elective course in the degree program must contain a substantial component in female authors or writers of color; one course must satisfy the genre competency requirement; and one course must be a world literature course. A list of courses fulfilling these requirements is available in DegreeWorks or on the English website. Degree candidates must meet Advanced Professional Studies requirements (including clearances and minimum GPA) and apply for APS admission after 60 credits.

English Major (B.A. or B.S.Ed.)

Comparative Literature Option

To facilitate the study of literature from an international perspective, the English and foreign languages departments offer an option in comparative literature. The comparative literature option is available for students who complete 18 hours selected from the English and foreign languages curricula. Candidates must also complete at least two semesters of one foreign language at the college level or demonstrate foreign language proficiency at the intermediate level.

Candidates will select from among the following courses:

English Department (two):

ENGL 231 World Literature I

ENGL 232 World Literature II

ENGL 441 Poetry

ENGL 442 Drama

ENGL 443 Prose Fiction
ENGL 451 Literary Theory

Humanities Series (two):
HUMN 210 French Literature
HUMN 220 German Literature
HUMN 221 German Authors
HUMN 270 Russian Literature
HUMN 280 Spanish Literature

Candidates will also select one of the following courses in the foreign languages department:

HUMN 202 Classical Mythology
HUMN 240 Greek Literature
HUMN 250 Latin Literature

All candidates will take ENGL 431: Comparative Literature.

Observation: Upon approval, a student may substitute an upper-level foreign language course for a humanities series course. For further information about the comparative literature option, please contact Dr. Robert Carballo or Dr. Jill Craven.

English Major (B.A. or B.S.Ed.)

English as a Second Language (ESL) Option

This option allows both liberal arts and secondary education students to pursue concentrated study in the area of teaching English as a second language. Students enrolled in this option fulfill all existing departmental requirements (including ENGL 220: Introduction to Language Study), but they must complete the following courses, which can be credited as departmental electives:

ENGL 221 Introduction to Linguistic Analysis

- or -

ENGL 322 History of English
ENGL 321 Transformational Grammar
ENGL 463 Applied Linguistics

ENGL 464 Teaching English to Speakers of Other Languages

All ESL students are encouraged to seek opportunities for ESL tutoring in addition to electing foreign language coursework. Also, ESL students enrolled in the secondary education program are encouraged to request a student-teaching assignment which provides them with the opportunity to teach non-native speakers of English. For more information, contact Dr. Yufeng Zhang.

English Major (B.A. or B.S.Ed.)

Film Studies Option

The film studies option enables English B.A. or B.S.Ed. majors to develop skills and proficiency in the discipline of film studies, including its history, aesthetics, terminology, methods of analysis, theoretical frameworks and interrelationships with society/culture.

All candidates will take:

ENGL 240 Introduction to Film
ENGL 481 History of Film

Candidates will select one of the following courses in the English department:

ENGL 347 Studies of Ethnicity in Film
ENGL 482 Film and American Society
ENGL 483 Politics, Film & Electronic Media
ENGL 484 Brave New Worlds: Exploring Technology in Film

Candidates will also select one of the following courses outside the English department:

ANTH 227 Culture Through Film
ECON 305 Economics in Film
PHIL 327 Philosophy in Film

English Major (B.A. or B.S.Ed.)

Linguistics Option

The linguistics option enables English B.A. or B.S.Ed. majors to pursue in a formal way an interest in language study. Students enrolled in this option fulfill all existing departmental requirements (including ENGL 220: Introduction to Language Study), but in lieu of 9-12 hours of English electives, they complete the following program of study:

1. One course in theoretical linguistics:
ENGL 321 Transformational Grammar
2. One course in historical linguistics:
ENGL 322 History of the English Language - or -
ENGL 465 Special Topics in Language: Seminar (if its content is so oriented)
3. One course in applied linguistics:
ENGL 463 Applied Linguistics - or -
ENGL 465 Special Topics in Language: Seminar (if its content is so oriented)
4. One other course in linguistics:
ENGL 221 Introduction to Linguistic Analysis - or -

ENGL 462 Dialects of American English -or-
 ENGL 464 Teaching English to Speakers of Other Languages - or -
 ENGL 465 Special Topics in Language: Seminar

In addition, students complete the equivalent of two semesters of foreign language study. The foreign language requirement of this concentration simultaneously fulfills general education requirements.

English Major (B.A. or B.S.Ed.)

Print Journalism Option, 12 s.h.

Required Courses, 9 s.h.

ENGL 313 Fundamentals of Journalism
 ENGL 315 Advanced Reporting
 ENGL 317 Editing for Publication - or -
 ENGL 330 Computer-Assisted Journalism

Electives, 3 s.h.

ENGL 250 The Press and Society
 ENGL 327 Feature Writing and Magazine Journalism
 ENGL 435 Journalism through Women's Perspectives
 ENGL 473 Special Topics in Journalism

English Major (B.A. or B.S.Ed.)

Writing Studies Option

The writing studies option enables English B.A. or B.S.Ed. majors to pursue focused study in the discipline of writing, which draws from subfields such as the history of rhetoric and composition, literacy, theories of writing pedagogy, and writing and multimedia.

Candidates will take:

ENGL 272: Introduction to Writing Studies

Candidates will select two of the following elective courses—at least one must be from the English department, and at least one must be at the 400 level:

ENGL 280: Rhetoric of Color Line
 ENGL 312: Technical Writing
 ENGL 313: Fundamentals of Journalism
 ENGL 316: Business Writing
 ENGL 340: Visual Rhetoric
 ENGL 342: Reading and Writing for Civic Change
 ENGL 466: Special Topics in Writing Studies Seminar
 ENGL 471: Creative Writing
 ENGL 472: Writing Workshop
 COMM 311: Environmental Advocacy
 COMM 317: Intercultural Communicology
 COMM 342: Theories of Rhetoric
 COMM 403: Persuasion
 COMM 430: Culture and the Semiotics of Communication
 COMM 441: Political Communication

Candidates will select one of the following capstone courses:

ENGL 400: Cooperative Education
 ENGL 491: Thesis (3-credit)

Journalism Minor

Track 1 required for English Majors Taking Journalism Option, 18 s.h.

English majors who have chosen the option in journalism and also wish to receive the minor in journalism must select six additional courses from ENGL 250, 300, 318, 327, 328, 330, 400, 435, 473. Students may not count any course toward the minor in journalism that they have used to meet requirements for the journalism option.

Journalism Minor

Track 2 required for Non-English Majors or English Majors Without Journalism Option, 18 s.h.

18 credits minimum (beyond required composition courses), including ENGL 313, 315, 317 or 318 or 330, 473 and two of the following: ENGL 250, 300, 318, 327, 330, 400, 435.

General English Minor

18 credits minimum (beyond the required composition courses), including at least one course in each of the following areas: language/linguistics, literature and writing. Selection of individual courses must be consistent with University-wide curricular policies for minors.

American Literature Minor

18 credits minimum (beyond required composition courses), including ENGL 235, 236, 237 and three of the following: ENGL 331*, 421, 422, 423, 424, 425, 426, 427, 428, 429, 482, HUMN 400*.

*When its primary focus is American literature.

British Literature Minor

18 credits minimum (beyond required composition courses), including ENGL 233, 234, 237, 405 and two of the following: ENGL 331*, 403, 404, 406, 407, 408, 411, 412, 413, 414, 415, HUMN 400*.

*When its primary focus is British literature.

Film Studies Minor

18 credits minimum (beyond required composition courses), including ENGL 240, 347, 481, 482, 483, 484 and one of the following: PHIL 327, ANTH 227, ECON 305. Students may apply to count film courses taken at Franklin & Marshall College.

Linguistics Minor

18 credits minimum (beyond required composition courses), including ENGL 220, 321, 322, 462, 463 and one of the following: ENGL 221, 464, 465.

Writing Studies Minor

18 credits minimum, consisting of 1 core course: ENGL 272; 4 elective courses from ENGL 280, 311, 312, 313, 316, 340, 342, 471, 491; COMM 311, 317, 342, 403, 430, 441; GERM 351, 352; FREN 351, 352; SPAN 351, 352 (2 courses must be from within the English department, and at least one course must be at the 400 level); 1 capstone course from ENGL 400 or ENGL 472.

COURSE DESCRIPTIONS**ENGL 110: 3 s.h.****English Composition**

Required course in general education. Introduces strategies of expository and argumentative writing and provides practice in standard written English. Individual instructors use print or nonprint media to achieve this goal. Evaluations based on competency, not on progress. Minimum grade of C- designates competency.

ENGL 110H: 3 s.h.**Honors English Composition**

Develops research and analytical skills; presumes basic writing competence. Students who demonstrate competency in ENGL 110 may be exempt from this requirement with written approval of the honors program director. Offered fall, spring.

ENGL 111: 1 s.h.**English Composition Lab**

Workshop to accompany ENGL 110.

ENGL 220: 3 s.h.**Introduction to Language Study (G1)**

Study of the historical development and present characteristics of the English language, the process of language learning, social and geographical dialects and semantics. An overview of linguistic investigation. Offered fall, spring.

ENGL 221: 3 s.h.**Introduction to Linguistic Analysis (G1)**

Investigates sounds, word structure, syntax and semantics of American English from the point of view of modern linguistics. Offered periodically. Prereq: ENGL 110.

ENGL 230: 3 s.h.**Introduction to Literature (G1)**

Reading, analysis and interpretation of various literary genres (poetry, fiction and drama) selected from different periods, with emphasis on cultural contexts. Not for English major credit. Offered fall, spring.

ENGL 231: 3 s.h.**World Literature (G1)**

Explores texts of world literature from various traditions and historical periods up until the mid-18th century. Examines themes, culture and historical contexts from Western and non-Western works to understand human experience. Offered fall, spring. Prereq: ENGL 110.

ENGL 232: 3 s.h.**World Literature II (G1)**

Explores texts of world literature from various traditions and historical periods from the late 18th century to the present. Examines themes, culture and historical contexts from Western and non-Western works to understand human experience. Offered fall, spring. Prereq: ENGL 110.

ENGL 233: 3 s.h.**Early English Literature (G1)**

Survey of English literature from Anglo-Saxon times to 1800. Emphasis on historical and cultural contexts, new genres and thematic relationships. Offered fall, spring. Prereq: ENGL 110.

ENGL 234: 3 s.h.**Later English Literature (G1)**

Survey of English literature from 1800 to the present. ENGL 233 is not a prerequisite. Emphasis on historical and cultural contexts, new genres and thematic relationships. Offered fall, spring. Prereq: ENGL 110.

ENGL 235: 3 s.h.**Early American Literature (G1)**

Learn foundational texts of Early American literature through 1860s. Discuss the issues, conflicts, preoccupations and themes of various early American writers. Offered fall, spring. Prereq: ENGL 110.

ENGL 236: 3 s.h.**Later American Literature (G1)**

Learn foundational texts of American literature from 1865 to the present. Discuss the issues, conflicts, preoccupations and themes of various later American writers. ENGL 235 is not a prerequisite. Offered fall, spring. Prereq: ENGL 110.

ENGL 237: 3 s.h.**Introduction to Techniques of Literary Research and Analysis**

Textual, critical and rhetorical analysis of literary genres. Designed to familiarize the student with literary theory and interpretation of genres through research and analytical writing. Offered spring. Prereq: ENGL 110.

ENGL 240/240H: 3 s.h.**Introduction to Film (G1, W)**

Analysis of film as an art form, including technical and artistic aspects of filmmaking. Genres, auteur theory and other theoretical approaches to cinema. Offered fall, spring. Prereq: ENGL 110.

ENGL 241H: 3 s.h.**Explorations in World Literature (G1, W, D)**

Investigates connections among a selection of representative literary works from at least three different linguistic traditions and various historical periods in both Western and non-Western cultures. Offered spring. Prereq: ENGL 110, member of University Honors College or 3.35 GPA.

ENGL 242: 3 s.h.**Reading Our World (G1, W)**

Applies critical lenses from fields of English studies to a selection of texts on a particular theme. Engages students in interpreting current themes across cultures and/or time periods. Students will explore the topic from different perspectives by learning methods for critiquing texts, including new media. Themes/topics determined by instructor. Offered fall, spring. Prereq: ENGL 110.

ENGL 250: 3 s.h.**The Press and Society (G1, W)**

Explores journalism's role in American society by analyzing the problems facing journalists in the realms of politics, law, corporate power and ethics. Offered fall, spring. Prereq: ENGL 110.

ENGL 272: 3 s.h.**Introduction to Writing Studies (G1, W)**

Focuses on some of the major areas of scholarship related to the practice of writing: literacy practices; historical accounts of writing instruction; the relationship of classical rhetoric to contemporary writing; writing across the curriculum; studies of professional and workplace writing; computers and writing; social, political and economic dimensions of writing; and others. Offered fall. Prereq: ENGL 110.

ENGL 273: 3 s.h.**Writing in the Disciplines**

Examines writing across three major academic domains: sciences, social sciences and humanities. Explores how disciplinary conventions and rhetorical contexts call for different writing strategies, particularly different choices in purpose, content, language, style, voice, tone and organization.

ENGL 274: 3 s.h.**The Craft of Writing: Argumentation and Stylistics**

Explores writing as a varied set of deliberate, artful choices in regard to argumentation modes, types of support and stylistics, all crafted for specific audiences.

ENGL 280: 3 s.h.**Rhetoric of the Color Line (D, W)**

Introduces students to the way race relations in this country have been shaped through racial dominance and resistance arguments, using the black-white binary as the guiding paradigm. The course will study rhetorical principles to critique primary texts to ultimately examine contemporary racial identities. Offered fall. Prereq: ENGL 110, 30 credit hours.

ENGL 292: 3 s.h.**Science Fiction (G1, W)**

The nature and development of science fiction from Jules Verne and H. G. Wells to major writers of the present, with emphasis on methods of extrapolation—descriptions of consistent, altered frames of reference based on scientific knowledge and historical, social or cultural patterns. Emphasis on multiple lines of inquiry or analysis. Offered fall. Prereq: ENGL 110.

ENGL 300/400: 3-6 s.h.**Cooperative Education**

A variety of options are available for English majors to apply their fields of study in professional contexts. Prereq: ENGL 110, 24 s.h. and permission of ELCM coordinator.

An (AW) indicates that the course counts toward the advanced writing part of the general education requirements.

ENGL 311: 3 s.h.**Advanced Composition (AW)**

Exploration, evaluation and writing across diverse and dynamic writing contexts to create rhetorically sophisticated texts, such as memoirs, socially expressive essays or other varieties of creative nonfiction; Classical and/or Rogerian arguments; ethnographic studies; varieties of public discourses; innovative, multi-genre researched writing; summaries, abstracts, and literature reviews; and texts designed for websites, wikis and blogs. Prereq: ENGL 110 or equivalent, 60 s.h.

ENGL 312: 3 s.h.**Technical Writing (AW)**

Writing of scientific and technical reports, manuals, technical articles and correspondence. Emphasis on data collection and analysis. Prereq: ENGL 110 or equivalent, 60 s.h. or permission of instructor.

ENGL 313: 3 s.h.**Fundamentals of Journalism (AW)**

Focuses on journalistic storytelling style, with emphasis on writing news for digital and print media. Includes journalism history, law and ethics as applied to various news outlets. Offered fall, spring. Prereq: ENGL 110 or equivalent, 60 s.h.

ENGL 315: 3 s.h.**Advanced Reporting (W)**

Writing news and features from the perspective of actual field experience. Interviewing, following breaking news, discussion of state and local government, health, entertainment and other events that impact the public. All original work. Offered spring. Prereq: ENGL 313.

ENGL 316: 3 s.h.**Business Writing (AW)**

Informative and persuasive writing in business and industry. Extensive practice in writing letters, memorandums, proposals and reports. Emphasis on business-writing strategies and processes. Prereq: ENGL 110 or equivalent, 60 s.h.

ENGL 317: 3 s.h.**Editing for Publication**

Focuses on the role of the editor. Developing skills to improve copy, writing headlines and cutlines, designing content for websites and blogs as well as creating photographic, audio and video material for use on the web. Offered fall, spring. Prereq: ENGL 110 or equivalent.

ENGL 321: 3 s.h.**Transformational Grammar (G1)**

Analysis of the syntax of American English, including the traditional, the structural and the transformational-generative approaches. Offered fall. Prereq: ENGL 110, 220, 221 or permission of instructor.

ENGL 322: 3 s.h.**History of English (G1, W)**

Examines language change and its effects on the development of English phonology, morphology, syntax and semantics. Offered periodically. Prereq: ENGL 110.

ENGL 327: 3 s.h.**Feature Writing and Magazine Journalism**

Writing long-form features and enterprise stories, including photography, video and audio content to enhance story presentation on the Internet. All original work. Offered fall. Prereq: ENGL 313.

ENGL 328: 3 s.h.**Ethics in Digital Media Journalism**

Covers ethics of print media publication. Focuses on the development of ethics in writing and changes in journalistic standards. May include case-study analysis. Prereq: ENGL 110.

ENGL 330: 3 s.h.**Computer-Assisted Reporting**

Data-driven journalism, looking at the collection of data, analysis in software such as SPSS and the writing of longer-form articles about research. Offered fall.

ENGL 331: 3 s.h.**Special Topics in Literature**

Thematic investigation of a significant literary topic, major author or literary style. May be taken more than once for credit, since the topic varies. Offered periodically. Prereq: ENGL 110.

ENGL 333/333H: 3 s.h.**African-American Literature I:****The Beginnings Through the Harlem Renaissance (D, G1, W)**

Major writers and genres to circa 1935, with emphasis on the cultural roots and aesthetics within the American literary tradition. Offered fall. Prereq: ENGL 110.

ENGL 334/334H: 3 s.h.**African-American Literature II:****The Depression through the Black Arts Movement (D, G1, W)**

Major writers from circa 1935 to the present, with emphasis on literary theory, critical discourses and literary movements. Offered spring. Prereq: ENGL 110.

ENGL 336: 3 s.h.**New Dimensions to World Literatures (G1, D, W)**

Introduction to non-Western literary traditions through a theme selected by the instructor. Students will increase their awareness and appreciation of cultural differences and the art of literature. Prereq: ENGL 110.

ENGL 337: 3 s.h.**Women Writers in the Middle Ages (P)**

Investigates the work of women who lived and wrote in the medieval period, primarily (though not entirely) in Europe. Offered periodically. Prereq: COMM 100, ENGL 110, junior status.

ENGL 338: 3 s.h.**Folklore and Literature (G1)**

Folklore, with emphasis on literature, history, region, gender and class. Ballads, tales, riddles, legends, proverbs and other forms from American, English and international sources. Includes field collection projects. Offered periodically. Prereq: ENGL 110.

ENGL 340: 3 s.h.**Visual Rhetoric (W)**

Studies the interanimation of text and images and the rhetorical and theoretical problems of visual design by focusing on design as a means of communication. Offered annually. Prereq: ENGL 110

ENGL 342: 3 s.h.**Reading and Writing for Civic Change (G1, W)**

An introduction to the theory and practice of public discourse, with emphasis on civic discourse. Focuses on exploring the nature and function of being a citizen within a community and developing discourse skills to effect change in communities. Offered annually. Prereq: ENGL 110 and 311 or 312 or 313 or 316.

ENGL 347: 3 s.h.**Studies of Ethnicity in Film (G1)**

Examines issues of ethnicity in cinema. Studied ethnicities vary by semester. Course may be repeated two times for credit when the focal ethnicity differs. Offered biannually. Prereq: COMM 100, ENGL 110.

ADVANCED COURSES*British Literature*

All classes listed in the British Literature section are offered periodically.

ENGL 401: 3 s.h.**Old English Language and Literature (G1, W)**

An introduction to the structure of the Old English language and to Old English prose and poetry. Offered fall, even years. Prereq: ENGL 110.

ENGL 402: 3 s.h.**Middle English Language and Literature (W)**

An introduction to the structure of the Middle English language and to Middle English prose and poetry, exclusive of Chaucer. Offered spring, even years. Prereq: ENGL 110, 237.

ENGL 403: 3 s.h.**Chaucer**

Chaucer's life, times and important works; study of the language and pronunciation. Offered fall. Prereq: ENGL 110, 237.

ENGL 404: 3 s.h.**The English Renaissance**

Nondramatic literature during the late 15th and 16th centuries, from "Morte d'Arthur" through the early 17th century; prose and verse during the reigns of Lancaster, York and Tudor. Prereq: ENGL 110, 237.

ENGL 405/405H: 3 s.h.**Shakespeare**

Shakespeare's life, works and times; detailed consideration of major plays. Prereq: ENGL 110, 237.

ENGL 406/406H: 3 s.h.**17th-Century Literature Before the Restoration**

Metaphysical and cavalier poetry and other nondramatic literature from 1600 to 1660, exclusive of Milton's poetry. Prereq: ENGL 110, 237.

ENGL 407/407H: 3 s.h.**Milton**

A study of Milton's major poetry and selected prose works against the background of the Puritan Revolution. Prereq: ENGL 110.

ENGL 408: 3 s.h.**Restoration and 18th-Century Literature**

Study of English language literature written and/or published in Britain, Ireland and Scotland between 1660 and 1800. Includes female and male authors. Prereq: ENGL 110, 237.

ENGL 411: 3 s.h.**Romantic Literature**

Rise of Romanticism in late 18th century to the beginning of Victorianism. Emphasis on poetry and criticism between 1798 and 1832. Prereq: ENGL 110, 237.

ENGL 412: 3 s.h.**Victorian and Edwardian Literature**

Literary figures and their works (exclusive of fiction) against social and political backgrounds from 1832 to 1914. Prereq: ENGL 110, 237.

ENGL 413: 3 s.h.**British Literature Since 1914**

Literary figures and works against the background of crisis in the 20th century from the onset of World War I to the present. New movements, attitudes and experimental techniques. Prereq: ENGL 110, 237.

ENGL 414: 3 s.h.**The English Novel**

Studies in the English novel. The course emphasis will vary from semester to semester, focusing on 18th-, 19th- or 20th-century novels. May be taken more than once for credit since the content of the course varies. Prereq: ENGL 110, 237.

ENGL 415: 3 s.h.**Seminar in Selected British Writers**

Intensive study of the works of selected British writers. May be taken more than once for credit since the content varies. Prereq: ENGL 110, 237.

ENGL 416: 3 s.h.**The Woman Writer and Her World (G1, W)**

Chronological study of British women writers of poetry, prose, criticism and/or drama. Authors studied varies. Prereq: ENGL 110.

ENGL 418: 3 s.h.**Literature of Scotland and Ireland: 18th Century to the Present (G1, W)**

Survey course in the literature of Scottish and Irish writers. Authors studied varies. Offered infrequently. Prereq: ENGL 110.

American Literature

All classes listed in the American Literature section are offered periodically.

ENGL 421: 3 s.h.**Early American Literature to 1830**

Examination of colonial and federal literature, with some discussion of the beginnings of Romanticism. Special attention to Bradstreet, Taylor, Edwards, Franklin, Wheatley, Brockden Brown, Irving and Cooper. Prereq: ENGL 110, 237.

ENGL 422: 3 s.h.**The American Renaissance**

Focuses on transcendentalism and authors, including Hawthorne, Poe, Thoreau, Melville, Emerson, Whitman and Dickinson. Prereq: ENGL 110, 237.

ENGL 423: 3 s.h.**Development of the American Novel: 19th Century**

Narrative fiction from early and middle parts of the 19th century to "fin de siècle." Emphasizes the Romance, the Gothic tale and the rise of the novel. Prereq: ENGL 110, 237.

ENGL 424: 3 s.h.**The Emergence of Modern American Fiction: Realism and Naturalism to 1920**

Studies stylistic, thematic and philosophic issues relating to literary realism and naturalism. Selections from writers including Twain, Howells, James, Crane, Norris, London and Dreiser. Prereq: ENGL 110, 237.

ENGL 425: 3 s.h.**Modern American Fiction, 1920-1945**

Important American fiction writers of the 20th century, with emphasis on major developments in ideas and techniques. Special attention to Anderson, Fitzgerald, Hemingway, Faulkner, Steinbeck and others. Prereq: ENGL 110, 237 or permission of instructor.

ENGL 426: 3 s.h.**Modern American Drama (G1, W)**

American drama from World War I to the present, with emphasis on significant developments in styles and techniques explored by such dramatists as O'Neill, Hellman, Williams, Miller, Albee and others. Prereq: ENGL 110.

ENGL 427: 3 s.h.**Modern American Poetry**

Study of major American poets, including Eliot, Pound, Frost, Stevens, Williams and others; or of a school such as the Imagists, the Fugitives and others. Prereq: ENGL 110, 237 or permission of instructor.

ENGL 428: 3 s.h.**Contemporary American Literature: 1945–Present**

Major trends in poetry, fiction and drama since World War II. Emphasizes prominent authors, including Barth, Bellow, Mailer, Oates, Updike, Plath, Olson, Shepard, Mamet and others. Prereq: ENGL 110, 237.

ENGL 429: 3 s.h.**Seminar on Selected American Authors**

Intensive study of the works of selected American authors. May be taken more than once for credit. Prereq: ENGL 110, 237.

ENGL 430: 3 s.h.**Studies in Ethnic American Literature Since 1945 (D, P)**

Examines representative works of various ethnic groups in contemporary America. Develops an appreciation for and a critical understanding of multiculturalism and social tension reflected in contemporary ethnic literature. Discusses complex issues, such as race, ethnicity, power, gender and identity, that are involved in the process of Americanization. Prereq: COMM 100, ENGL 110 and junior status.

ENGL 494: 3 s.h.**Perspectives on the Harlem Renaissance (P)**

Interdisciplinary perspectives on the burst of creativity in African-American literature, theatre, musical revues, painting and film known as the Harlem Renaissance. Course is team-taught by faculty from English, history and music. Offered infrequently. Prereq: COMM 100, ENGL 110 and junior status.

Comparative Literature, Genre, Literary Criticism

Most classes listed in the Comparative Literature section are offered periodically.

ENGL 431: 3 s.h.

Comparative Literature I: 1850-1925

Explores modernism in literature. Traces the development of symbolism through the aesthetic movement. Offers a wide, comparative perspective to the study of literature, familiarizing the student with the comparative method. Prereq: ENGL 110, 237.

ENGL 435: 3 s.h.

Journalism Through Women's Perspectives (P)

Analysis of women's contributions to the development of journalism and journalistic writing styles. Offered spring, even years. Prereq: COMM 100, ENGL 110 and junior status.

ENGL 441/441H: 3 s.h.

Poetry Seminar

Seminar with emphasis on poetry as a genre. Topics may include prosody, poetry in translation, contemporary trends in verse and schools of poetry. Reflects comparative perspective. Prereq: ENGL 110, 237.

ENGL 442: 3 s.h.

Drama Seminar

Seminar with emphasis on drama as a literary genre. Emphasis on masterpieces of drama in the Western world. Prereq: ENGL 110, 237.

ENGL 443: 3 s.h.

Prose Fiction Seminar

Seminar examining fictional narratives, including the novel, creative nonfiction, novella and short story, that reflect comparative perspective. Prereq: ENGL 110, 237.

ENGL 445: 3 s.h.

The Short Story

Covers history, development and genres of the short story, with a focus on matters of style, interdisciplinary dimensions, historical and cultural contexts, and critical approaches. Offered annually. Prereq: ENGL 110, 237.

ENGL 451: 3 s.h.

Literary Criticism and Theory Seminar (P)

Seminar on major critics and theorists, from Plato to selected modern critics. Explores representative critical trends and controversies to develop students' varied perspectives on art, literary works and media. Strongly recommended for students considering graduate school. Offered annually. Prereq: ENGL 110, 237.

Linguistics

ENGL 460: 3 s.h.

Teaching ESL Listening and Speaking

Exploration of the nature of spoken English and current approaches to the teaching of ESL listening and speaking skills. Presents effective techniques and ideas for teaching ESL listening and speaking, and to integrating listening and speaking with other language skills. Offered fall, even years. Prereq: ENGL 110.

ENGL 462: 3 s.h.

Dialects of American English (P)

Study of the origin and the features of the regional and social dialects of American English. Offered fall, odd years. Prereq: COMM 100, ENGL 110 and junior status, and one course in linguistics or permission of instructor.

ENGL 463: 3 s.h.

Applied Linguistics (G1, W)

Application of linguistic theory to selected problems of language teaching and research. Offered spring, odd years. Prereq: ENGL 110 and one course in linguistics or permission of instructor.

ENGL 464: 3 s.h.

Teaching English to Speakers of Other Languages

Approaches, methods and techniques appropriate to teaching standard English to speakers of other languages. Includes international tutoring opportunities. Offered fall, odd years. Prereq: ENGL 110 or permission of instructor.

ENGL 465: 3 s.h.

Special Topics in Language: Seminar

Investigation of topics in linguistic science. May include generative metrics, morphophonics, tagmemic analysis; investigation of English language problems selected by students in conference with instructor. May be taken more than once for credit, as topic varies. Prereq: ENGL 110 and 3 hours in English language study or permission of instructor.

Writing

ENGL 466

Writing Studies Seminar: Special Topics (W)

In-depth investigation of topics in writing studies theory. May be taken more than once for credit with varied topic. Offered periodically. Prereq: ENGL 311 or 312 or 313 or 316.

ENGL 471: 3 s.h.**Creative Writing**

Extensive practice in writing varied genres of fiction and poetry. Inquiry into the social functions and purposes of fictional and poetic writing. Prereq: ENGL 110. Offered periodically.

ENGL 472: 3 s.h.**Writing Workshop**

Extensive written work focused on particular topics, a theme in literature or a specific genre in communication. Mini-research papers. Critiques of other student papers. Considerable discussion of other student papers. Offered periodically. Prereq: ENGL 311 or permission of instructor.

ENGL 473: 3 s.h.**Special Topics in Journalism**

Techniques and problems in journalism. Offered spring. Prereq: ENGL 313.

*Film***ENGL 481: 3 s.h.****History of Film (W)**

Analyzes the history of the world's film industry and influential narrative films, from early silents to recent independents. Technology-intensive course. Offered biannually in fall. Prereq: ENGL 110.

ENGL 482: 3 s.h.**Film and American Society (G1)**

Analyzes significant American films in relation to social and historical context. Offered biannually in spring. Prereq: ENGL 110.

ENGL 483: 3 s.h.**Politics, Film and Electronic Media (P)**

Explores the relationships between media, history, politics and people during the 20th and 21st centuries. Focuses on portrayal of American politics in film. The politics of narrative structure (Eisenstein, Godard), the relationships between narrative and ideology, and political documentaries. Prereq: COMM 100, ENGL 110 and junior status. Offered biannually in fall.

ENGL 484: 3 s.h.**Brave New Worlds: Exploring Technology in Film (G1, W)**

Explores the relationships between film, technology and society as they developed during the 20th century. Includes American and foreign films that focus on technology and/or address issues raised by technology. Special focus on directors Kubrick and Gilliam. Offered biannually in spring. Prereq: COMM 100 and ENGL 110.

*Education***ENGL 486: 3 s.h.****Teaching Reading and Literature with Young Adults**

Inquiries into reading and literature in middle and high school classrooms. Special emphases on strategies for motivation, engagement and support in reading; creating appropriate learning contexts; expanding student choice and book selection; and alternative methods of assessing reading/literature achievement. Required for B.S.Ed. in English. Course should be taken in fall prior to Advanced Professional Studies semester. Offered fall. Prereq: ENGL 110.

ENGL 487: 3 s.h.**Seminar in Teaching Writing (W)**

Explores the nature of writing instruction by balancing three stances: that of the writer, teacher and researcher. Engages students in a writers' workshop, developing inquiry through thoughtful discussions about writing pedagogy and by exploring new teaching processes in a case study of an adolescent writer. Must be taken prior to Advanced Professional Studies semester. Offered spring. Prereq or Coreq: ENGL 110, 311.

ENGL 488: 3 s.h.**Teaching Secondary School English**

Specialized problems of English instruction. Required for B.S.Ed. in English. Offered fall. Prereq: ENGL 486, 487, successful completion of the social and psychological foundations block and admission to The Professional Development School. Must be taken during semester immediately prior to EDSE 461: Student Teaching and Seminar. Must be taken concurrently with courses in Advanced Professional Studies block (EDSE 321, SPED 346, EDFN 330, EDSE 340).

SPECIAL ACADEMIC OPPORTUNITIES*Honors Courses*

ENGL 110H, ENGL 240H, ENGL 241H, ENGL 333H, ENGL 334H, ENGL 405H, ENGL 407H, ENGL 441H. See course descriptions as listed within this department. Also see *Honors* section of this catalog.

*Cooperative Education/Internships***ENGL 300 and ENGL 400: 3-6 s.h.**

See course descriptions as listed within this department.

Independent Study, Thesis and/or Departmental Honors

ENGL 489, 498, 499: 1-3 s.h.

For information on independent study and departmental honors, see your advisor.

GRADUATE COURSES

All 500-level courses are open to qualified undergraduates with permission. For course descriptions, please refer to the *Graduate Catalog*.

ENGL 586-589: 3 s.h.**Special Topics**

In addition to course requirements outlined by each department, students must meet additional degree requirements. For more information, see the Academic Requirements section.

ENTREPRENEURSHIP MINOR

Co-Directors Nancy Mata and Jeri Robinson

The minor in entrepreneurship is a dynamic interdisciplinary program that provides opportunities to Millersville students from different disciplines to interact and learn about entrepreneurship—the process of creating value through recognizing and developing opportunities. It serves to complement the student's major area of study by providing the knowledge and skills needed so that students can create or start their own ventures, work for start-up companies or a family business, or pursue traditional jobs that may involve launching new business units or joint ventures. The goal of the Entrepreneurial Minor is to learn to think entrepreneurially, identify resources and tools, formulate business plans, and devise clear and compelling value propositions as well as ethical practices.

Entrepreneur Minor: 18 s.h.

Required courses: ENTR 201: Art of Entrepreneurship; ENTR 315: Entrepreneurial Practicum; COMM 390: Social Media Campaigns; WSTU 491: Creativity, Innovation and Engagement; ENTR 488: Capstone in Entrepreneurship. Students will then pick additional courses from the approved list of courses to satisfy the three additional credits.

COURSE DESCRIPTIONS**ENTR 201: 3 s.h.****Art of Entrepreneurship**

This course introduces and explores the mind-set and process of entrepreneurship in: (1) social entrepreneurship (solving social issues); (2) business entrepreneurship (starting an innovative enterprise); (3) employee entrepreneurship (as a worker in an existing business) and (4) academic entrepreneurship (the pursuit of a valuable and productive education). Emphasis will be on identifying opportunities and value, developing the art of creative problem solving and effectively expressing those solutions. Prereq: none.

ENTR 315/316: 3 s.h.**Entrepreneurial Practicum****(This course may be repeated up to two times for credit)**

This course serves as training for entrepreneurial leadership and emphasizes experiential learning in the practice and the development of skills that are needed by entrepreneurs, including effective leadership, collaboration, planning and communication. Prereq: ENTR 201 or permission of instructor.

COMM 390: 3 s.h.**Social Media Campaigns**

This course emphasizes theory and practice in the strategic planning, writing, communication design, management and analysis of social media campaigns for mobile communications, social media and online social networking. Prereq: ENGL 110, COMM 100, junior status (60 credits earned) and COMM 251, or permission of instructor for ENTR minors.

WSTU 491: 3 s.h.**Women's Studies Topics: Creativity, Innovation and Engagement****ENTR 488****Capstone**

This course serves as a capstone for the entrepreneurship minor and provides students with the opportunity to work on a simulated or real start-up company, as well as examine case studies from leading entrepreneurs. Multidisciplinary teams of students work on mentor-defined or mentor-approved projects, from product or process conception towards commercialization. The course is intended to show what it takes to assemble teams with core competencies in different areas into a successfully functioning business organization. Teams work on a variety of issues, including intellectual property, marketing, definition of a product requirements document, human factors, safety and environmental concerns, and legal matters. Prereq: ENTR 201, ENTR 315 (co- or prerequisite).

ENTR 300: 3-6 s.h.**Co-op/internship**

Entry-level cooperative education or internship experience.

ENTR 400: 3-6 s.h.**Co-op/internship**

Cooperative education or internship assignment with increased responsibility over the COOP 300 level. Prereq: 300 level or equivalent.

ENTR 498: 1-6 s.h.**Independent Study**

Independent study is available for well-qualified students. Students who receive approval for independent study are expected to complete a significant study or project in some area of entrepreneurship. Prereq: ENTR minor director permission.

ENTR 500: 3-6 s.h.**Co-op/internship**

Cooperative education or internship assignment with increased responsibility over the COOP 400 level. Prereq: 400 level or equivalent.

Approved Entrepreneurship Courses

Descriptions of these courses may be found under the appropriate department listing.

ART 486: Special Topics in Studio Art

BUAD 101: The Introduction to Business (G3)

BUAD 202: Legal Environment of Business (G3)

CHEM 101: Chemistry, Better Things (G2)

COMM 206: Communication and Media Law

COMM 220: Mass Media

COMM 251: Public Relations I (G1)

CSCI 101: Introduction to Problem Solving with Computers (G2)

CSCI 121: Introduction to Internet Programming (G2)

ECON 102: Principles of Microeconomics (G3)

ECON 326: Economic Growth and Development (G3)

ECON 327: Women and Global Economic Development

ENGL 316: Business Writing (AW)

MUSI 190: Introduction to Careers in Music

MUSI 391: Music Industry

MUSI 392: Music in the Nonprofit Sector

THEA 350: Theatre Management

THEA 412: Topics in Theatre (Stage Management or Careers in Performance Arts)

ENVIRONMENTAL HAZARDS & EMERGENCY MANAGEMENT

Environmental Hazards & Emergency Management is an 18-credit interdisciplinary minor that draws upon the expertise and resources of four academic disciplines: sociology, geography, industry and technology, and earth sciences.

The curriculum has been designed to meet the professional development needs of those undergraduates who may wish to seek employment in emergency management within government or private enterprise. The EHEM minor has been designed to also meet the needs of undergraduates who may not seek a career in emergency management, but who may wish to learn about the field in conjunction with their primary career interests (e.g., the future journalist who may be reporting on environmental hazards, emergencies and disasters, or the future planner who may need to assess mitigation plans).

Students selecting the minor must take the four required courses, as well as two courses from a list of four electives. A list of additional "suggested" courses is included which provide knowledge and skills that are beneficial to the emergency management professional. These courses may be used to fulfill requirements in the general education curriculum or in the major, or might serve as electives which bring a student's total curriculum up to 120 credits. One course used to complete the EHEM minor may also be used to satisfy the student's major, when applicable.

Environmental Hazards and Emergency Management Minor: 18 s.h.

Required courses: ESCI 101, EHEM 201, EHEM 305, OSEH 120. Electives: Choose two from CHEM 101, CHEM 103, CHEM 111, EHEM 316, EHEM 498, GEOG 295, GEOG 372, OSEH 221, SOCY 313.

REQUIRED AND RECOMMENDED EHEM COURSES (Course descriptions may be found under the appropriate departmental listing of courses.)**Required Courses****EHEM 201: 3 s.h.**

Introduction to Emergency Management

EHEM 305: 3 s.h.

Disaster Management and Community Risk Reduction

ESCI 101: 3 s.h.

Earth Systems and Natural Hazards

OSEH 120: 3 s.h.

Fundamentals of Safety, Health and Environmental Issues

Elective Courses**CHEM 101: 3 s.h.**

Chemistry! Better Things for Better Living

CHEM 103: 3 s.h.
General, Organic & Biochemistry

CHEM 111: 4 s.h.
Introductory Chemistry I

EHEM 316: 3 s.h.
Introduction to Terrorism, WMD and Homeland Security

OSHE 221: 3 s.h.
Industrial Fire Prevention, Protection and Control

GEOG 295: 3 s.h.
Geographic Information Systems

GEOG 372: 3 s.h.
Urban and Regional Planning

EHEM 498: 3-6 s.h.
Internship or Special Independent Project in Emergency Management (contracted with any of the participating departments)

SOCY 313: 3 s.h.
Sociology of Disaster

Suggested Courses

BUAD 251: 3 s.h.
Organization and Management

ESCI 221: 4 s.h.
Physical Geology

ESCI 245: 3 s.h.
Environmental Meteorology

ESCI 261: 4 s.h.
Introduction to Oceanography

ESCI 366: 4 s.h.
Ocean Resources

GEOG 281: 3 s.h.
Map Interpretation and Analysis

GEOG 336: 3 s.h.
Climate and Society

GOVT 112: 3 s.h.
State and Local Government

GOVT 205: 3 s.h.
Introduction to Public Safety

GOVT 241: 3 s.h.
Public Administration

PSYC 329: 3 s.h.
Industrial/Organizational Psychology

SOCY 101: 3 s.h.
Introduction to Sociology

SOCY 211: 3 s.h.
Social Problems

SOCY 318: 3 s.h.
Complexity of Organizations

COURSE DESCRIPTIONS

EHEM 201: 3 s.h.
Introduction to Emergency Management (G3)

An introduction into all aspects of emergency management, from the origins through the civil defense era to the present day, with a look towards the future of the global aspect of emergency management. Students will learn the basics of emergency management, how to function as an effective emergency manager and how to manage an emergency management agency. Prereq: ENGL 110.

EHEM 305: 3 s.h.
Disaster Management and Community Risk Reduction (G3)

Study of current trends of building disaster-resilient and disaster-resistant communities to limit the scope of the devastation from disasters. An examination into prevalent legislation that controls and shapes both building construction and land-use planning, technological advances for building a disaster-resistant community and legal issues of community planning. Prereq: EHEM 201

EHEM: 316: 3 s.h.

Introduction to Terrorism, WMD and Homeland Security (G3)

An introduction into all aspects of terrorism, weapons of mass destruction and homeland security in our modern world. A study of the overall history of terrorism, legislation that oversees emergency management, and various methods for combating terrorism. How to manage an emergency management agency through modern-age terrorism threats. Prereq: EHEM 201.

ENVIRONMENTAL STUDIES

Five multidisciplinary minors are available that have been designed for students with an environmental interest. We believe that a full major in a discipline is an important foundation on which to build expertise in a specific environmental area and designed the minors to complement majors in the sciences, technology and social sciences. Increasingly, environmental problems are addressed by multidisciplinary teams, so the minors prepare students to operate in this multidisciplinary setting.

The environmental minors are coordinated by the Center for Environmental Science (CES), and the director of the CES is the primary contact for the minors.

For information on environmental studies and for course prerequisites, also see the *Biology, Chemistry, Earth Sciences* and *Geography* sections.

For information on environmental options within majors, also see the *Biology, Chemistry, Earth Sciences* and *Geography* sections.

Environmental Policy and Regulation Minor: 18 s.h.

This minor prepares a student to move successfully toward graduate school in policy or as staffers in the environmental regulation/policy community.

Core Courses

ECON 207: 3 s.h.

Environmental Economics

ENVI 330: 3 s.h.

Environmental Statistics and Risk Assessment

OSEH 220: 3 s.h.

Legal Aspects of Environmental Safety

ENVI 495: 3 s.h.

Environmental Clinic

Elective Courses (Choose Two)

GEOG 306: 3 s.h.

Environmental Impact Assessment

GEOG 372: 3 s.h.

Urban and Regional Planning

OSEH 435: 3 s.h.

Environmental Technology

SOCY 313: 3 s.h.

Sociology of Disaster

Industrial and Environmental Health Minor: 19-21 s.h.

This minor provides the background needed to understand the link between environmental issues and public health.

Core Courses

OSEH 321: 4 s.h.

Environmental and Industrial Health I

OSEH 435: 3 s.h.

Environmental Technology

ENVI 330: 3 s.h.

Environmental Statistics and Risk Assessment

ENVI 495: 3 s.h.

Environmental Clinic

Elective Courses (Choose Two)

BIOL 204: 3 s.h.

Human Biology (W)

BIOL 255: 4 s.h.

Human Anatomy and Physiology II

BIOL 435: 3 s.h.

Animal Physiology

BIOL 455: 3 s.h.
Cardiopulmonary Physiology

CHEM 232: 4 s.h.
Organic Chemistry II

CHEM 235: 4 s.h.
Short Course in Organic Chemistry

CHEM 375: 4 s.h.
Environmental Chemistry

ESCI 322: 3 s.h.
Environmental Hydrology

ESCI 329: 3 s.h.
Aqueous Geochemistry (W)

ESCI 349: 3 s.h.
Chemistry of the Atmosphere (P)

ESCI 426: 3 s.h.
Groundwater Geology

Land-Use Minor: 18-19 s.h.

This minor explores the physical and economic impact of human land-use practices and the ways in which land use can be sustainable both for human life and for the maintenance of essential biological diversity.

Core Courses

ECON 207: 3 s.h.
Environmental Economics

GEOG 372: 3 s.h.
Urban and Regional Planning

ENVI 495: 3 s.h.
Environmental Clinic

BIOL 241: 3 s.h.
Principles of Ecology

Elective Courses

Choose one of the following:

ESCI 225: 3 s.h.
Geomorphology

ESCI 322: 3 s.h.
Environmental Hydrology

ESCI 329: 3 s.h.
Aqueous Geochemistry (W)

ESCI 426: 3 s.h.
Groundwater Geology

ESCI 429: 3 s.h.
Weathering Systems Science

ENVI 330: 3 s.h.
Environmental Statistics and Risk Assessment

GEOG 227: 3 s.h.
Urban Geography

GEOG 305: 3 s.h.
Geography of Energy (W)

GEOG 333: 3 s.h.
Biogeography

Choose one of the following GIS courses:

ESCI 281: 3 s.h.
GIS Applications for the Earth Sciences

GEOG 295: 3 s.h.
Geographic Information Systems

GEOG 395: 4 s.h.
Advanced GIS

Quantitative Methods in Environmental Science Minor: 18 s.h.

This minor emphasizes the quantitative and technical skills valued by both employers and graduate programs in environmental science.

Core Course

ENVI 495: 3 s.h.
Environmental Clinic

Elective Courses

Choose one Statistics course from:

ENVI 330: 3 s.h.
Environmental Statistics and Risk Assessment

BIOL 375: 3 s.h.
Biometry

Choose one of the following GIS courses:

ESCI 281: 3 s.h.
GIS Applications for the Earth Sciences

GEOG 295: 3 s.h.
Geographic Information Systems

GEOG 395: 4 s.h.
Advanced GIS

Choose three of the following:

ESCI 267: 3 s.h.
Field Methods in Oceanography

ESCI 322: 3 s.h.
Environmental Hydrology

ESCI 349: 4 s.h.
Chemistry of the Atmosphere (P)

ESCI 426: 3 s.h.
Groundwater Geology

ESCI 447: 3 s.h.
Meteorological Instrumentation, Measurement and Observing Systems (W)

CHEM 265: 4 s.h.
Quantitative Analysis

CHEM 375: 4 s.h.
Environmental Chemistry

CHEM 476: 4 s.h.
Environmental Chemistry II

BIOL 241: 3 s.h.
Principles of Ecology

OSEH 321: 4 s.h.
Environmental and Industrial Hygiene I

ITEC 465: 3 s.h.
Instrumentation and Control

Water Resources Minor: 18-21 s.h. This minor provides an environmental perspective on water resource issues, including remediation techniques and solutions, chemical analysis techniques and the use of aquatic organisms to monitor contamination and recovery.

Required Courses

GEOG 304: 3 s.h.
Water Resources Management

ENVI 330: 3 s.h.
Environmental Statistics

ENVI 495: 3 s.h.
Environmental Clinic

Elective Courses

Choose three of the following:

BIOL 241: 3 s.h.
Principles of Ecology

BIOL 445: 3 s.h.
Aquatic Biology

BIOL 447: 3 s.h.
Chesapeake Bay System (W)

CHEM 375: 4 s.h.
Environmental Chemistry

CHEM 476: 4 s.h.
Environmental Chemistry II

ESCI 322: 3 s.h.
Environmental Hydrology

ESCI 329: 3 s.h. (W)
Aqueous Geochemistry

ESCI 426: 3 s.h.
Groundwater Geology

COURSE DESCRIPTIONS

Course descriptions are found in the appropriate departmental section.

ENVI 495: 3 s.h.
Environmental Clinic

A capstone course devoted to the definition and assessment of an environmental problem from watershed, airshed, biodiversity and human health perspectives. Case studies will be used as models of how environmental problems can be defined/documented and solutions can be implemented. Student teams will define a problem and implement a solution using interdisciplinary approaches while working with a faculty team. Students are encouraged to take this course at the conclusion of the minor. Offered periodically. Prereq: 12 credits of environmental science minor.

FINANCE

See Business Administration

FIRST YEAR INQUIRY SEMINAR

UNIV 103: 3 credits
First Year Inquiry Seminar

Each First Year Inquiry (FYI) Seminar section focuses on a different topic of strong interest to faculty and students. Seminars jump-start the process of intellectual inquiry through a free exchange of ideas during and outside of class. FYI instructors mentor and assist students in developing a meaningful and purposeful approach to their college experiences. The FYI Seminar counts in the Connections and Exploration area of the General Education curriculum.

FOREIGN LANGUAGES

College of Arts, Humanities and Social Sciences

Associate Professor Nimmrichter, chairperson

Associate Professors Antolín, Börger-Greco, Gaudry, Moine, Rivera-Hernández

Assistant Professor Valentín-Márquez

For initial placement of freshmen, the department advises that the following guidelines be used:

0-1 year of high school FORL	FORL 101
2 years of high school FORL	FORL 102
3-4 years of high school FORL	FORL 201
4-5 years of high school FORL	FORL 202

A placement examination will be administered every semester to incoming freshman language majors and to those nonmajors intending to take FORL 201, 202, 351 or 352. Consult individual language sections for current policy.

Students who in the first week of classes consider themselves improperly placed should discuss the matter with their instructor so that changes can be made promptly.

All students are required to take an oral proficiency interview at the end of their sophomore year and at the beginning of their senior year. B.S.Ed. students are required to take the official OPI/OPIC and receive a rating of Advanced Low or higher, as well as the official WPT and receive a rating of Intermediate High or higher prior to graduation.

Attention is called to the Millersville University Foreign Language Summer Programs, in which graduate students can live together in their own schools and speak the target language at all times. Well-prepared undergraduate students may participate following their junior year with a recommendation from their department chairperson and advisor.

STUDY ABROAD

Language majors considering spending their junior or senior year abroad at an international university are advised to discuss the matter with their advisors, the department of Foreign Languages study-abroad advisors, and the Office of Global Education and Partnerships at an early date.

Millersville has official partners in Chile, Germany, Puerto Rico, France and Spain (for a complete list of partners, refer to *Study Abroad* section of this catalog). Language study in other countries is also possible via non-Millersville programs coordinated by the Office of Global Education and Partnerships. For more information about study abroad, contact the Office of Global Education and Partnerships, Cumberland House, at 717-871-7506, or email globaleducation@millersville.edu.

COURSE REQUIREMENTS

French, German or Spanish Major (B.A.): 120 s.h.

Specialization in French, German or Spanish. A minimum of 36 s.h. in major language: FORL 201, 202, 6 s.h. in literature (311, 312, 313, or 314), 3 s.h. in civilization (331, 332, 333, or 334), 351, 352, 470, 3 s.h. in literature (400 level), plus courses in language, literature and civilization in consultation with an advisor. Four courses in a required second language (12 s.h.) and two courses in a third language (6 s.h.) are to be chosen from among the ancient or modern languages in consultation with advisor. NOTE: In lieu of the second and third language requirements, students may elect to minor in a language (a minimum of 18 credits; see minor requirements). Students pursuing a second major in another discipline are not required to complete the second or third language requirement. Required related courses: ENGL 220, one course each in history or geography and the humanities related to the foreign language area of study in consultation with advisor. Study abroad strongly recommended.

French, German or Spanish Major (B.S.Ed.): 120 s.h. Certification in Secondary Education

FORL 201, 202; 6 s.h. in literature (311, 312, 313, or 314); 3 s.h. in civilization (331, 332, 333, or 334), 351, 352, 470; 3 s.h. in literature (400 level), and 480, ENGL 220 and one required related course as listed on the curriculum sheet for your major. Three courses (9 credits) in a second foreign language. Certification may be earned in two language areas. Early planning in consultation with advisor is essential, and study abroad is strongly recommended. For those seeking dual certification, the 101 and 102 courses in the second language count toward the degree requirements.

In addition to the above, EDFN 211, 241 and 330; EDSE 321 and 471; SPED 346 and student teaching are also required.

Foreign Language Major (B.A. or B.S.Ed.): 120 s.h. (International Business Option (French, German, Spanish))

Foreign language majors who wish to prepare for a career in international business should take FORL 211, 212, 301 and 460. It is recommended that students exercising this option take one of the minors offered by the business department.

French majors have been successful in achieving the Paris Chamber of Commerce Certificate.

French, German, Latin or Spanish Minor

Consists of a minimum of 18 s.h., including 201*, 202* (*higher-level courses may be substituted for these courses), 351 and/or 352 plus electives at the 300 or 400 level, for a total of 18 credits. (See foreign languages advisor.)

COURSE DESCRIPTIONS

NOTE: All courses designated HUMN (Humanities) are required for B.A. foreign language majors as a required related course.

French

FREN 101: 3 s.h.

Elementary French I (G1)

Introduction to language and culture. Fundamentals of grammar and syntax. Oral and written practice, short readings and practice in aural comprehension. Emphasis on learning useful everyday phrases and working toward accuracy in pronunciation. Offered fall.

FREN 102: 3 s.h.

Elementary French II (G1)

Continuation of language and culture, with emphasis on more complex syntactical structures while working toward greater proficiency in speaking, writing, reading and listening skills. Offered spring. Prereq: FREN 101 or 2 years of high school French.

FREN 201: 3 s.h.

Intermediate French I (G1)

Emphasis is placed on further developing the language skills through varied realistic exercises and real-life situations. Contemporary cultural and literary texts provide the thematic basis for oral and written communication. Offered fall. Prereq: FREN 102 or placement exam.

FREN 202: 3 s.h.

Intermediate French II (G1)

Continued emphasis on language skills started in FREN 201. Oral and written communication in speech and writing remains the primary goal; structures and vocabulary are studied in greater depth. Emphasis on developing a cross-cultural perspective by comparing student's native culture with the target culture. Offered spring. Prereq: FREN 201 or placement exam.

HUMN 210: 3 s.h.

French Literature in English (G1, W)

Outstanding masterpieces taught in English by an instructor of French. Designed primarily as an elective for nonmajors desirous of enriching their knowledge of foreign literature. Offered periodically. Prereq: ENGL 110.

HUMN 391: 3 s.h.**Topics in the Humanities (G1, W)**

In-depth investigation and development of a topic of current interest not covered in regularly scheduled courses. The topics will vary according to the needs and interests of the students and the faculty involved. Specific topics will be identified by the subtitles each time the course is offered. Course may be taken for credit each time the content (subtitle) is different. Offered periodically. Prereq: ENGL 110.

FREN 301: 3 s.h.**Commercial French**

Commercial vocabulary and stylistics of French for the professions. The parts of the business letter, study of general types of business correspondence, oral and written interactions in a professional context, including letters requesting and offering information, mail orders, sales letters, applications for employment, complaints, claims, collection, credit, etc. Includes the opportunity to take the Certificate of Professional French given by the Paris Chamber of Commerce. Offered periodically. Prereq: FREN 202 or 351.

FREN 311: 3 s.h.**Survey of Literature I**

Life and work of foremost French writers through the 18th century. Reading and discussion of selected works in various genres. Offered spring in alternating years. Prereq: FREN 351 or 352.

FREN 312: 3 s.h.**Survey of Literature II**

Life and work of foremost French and Francophone writers since 1800. Reading and discussion of selected works in various genres. Offered spring in alternating years. Prereq: FREN 351 or 352.

FREN 331: 3 s.h.**French Civilization I**

History and development of French civilization from prehistoric times to 1789. Civilization and art of the Gauls, influence of the Roman Conquest, Germanic invasions, unification of the country through the various dynasties. The art of each period will be studied, with emphasis on architecture. Offered periodically. Prereq: FREN 202 or 351.

FREN 332: 3 s.h.**French Civilization II**

French history, art and culture from 1789 to modern times. Emphasis will be given to painting in the 19th and 20th centuries. Outside readings and class reports. Offered periodically. Prereq: FREN 202 or 351.

FREN 333: 3 s.h.**French Civilization III**

All aspects of contemporary France and/or Francophone countries: geography, economy, institutions and modern society. Emphasis on the study of the diversity of the different regions. Offered periodically and/or online. Prereq: FREN 202 or 351.

FREN 351 and 352: 3 s.h. each**Composition and Oral Expression (G1, W)**

Systematic practice in the language designed to hone oral and written skills to a level of proficiency, enabling expression with accuracy and fluency. A grammar review. Offered fall in alternating years. Prereq: ENGL 110, FREN 202 or placement exam.

FREN 353: 3 s.h.**Introduction to Phonetics**

Phonetics and phonology of the French language. Correct pronunciation of standard French, free from the deformation resulting from interference of the speech habits of native speakers of English. Offered infrequently. Prereq: FREN 202.

FREN 361 and 362: 3 s.h. each**Oral French I and II**

Recommended particularly for secondary education foreign language majors. Considerable attention is given to the specific linguistic needs of prospective teachers. Intensive experience with the spoken language. Recorded exercises in comprehension. Conversations dealing with everyday life, with emphasis on acquisition of appropriate vocabulary. Emphasis on modern society and customs: schools, sports, holidays, literature, etc. Remedial treatment of phonetics and grammar. Offered periodically. Prereq: FREN 202 or equivalent.

FREN 411: 3 s.h.**French Poetry through the Ages**

From Marie de France and Villon (medieval) to Char and Prévert (contemporary), French Letters can boast of an extraordinary range of poets. Their works, poetic techniques, forms and cross-fertilization with music (the "chanson") are studied. Offered infrequently. Prereq: FREN 311 and 312.

FREN 421: 3 s.h.**French Drama I**

Medieval period to the 18th century. Masterpieces of that age of classicism in French; emphasis on Molière, Corneille and Racine. Outside readings. Offered infrequently. Prereq: FREN 311 and 312.

FREN 423: 3 s.h.**French Drama III**

Symbolist drama, existentialist drama and the theatre of the absurd. The plays of Claudel, Giraudoux, Anouilh, Montherlant, Sartre, Camus, Beckett, Ionesco, Adamov and others will be included. Offered infrequently. Prereq: FREN 311 and 312.

FREN 431: 3 s.h.**French Prose I**

Study of essays, letters, maxims, memoirs and novels to the end of the 17th century. Works of Rabelais, Montaigne, Pascal, and La Bruyère will be included. Outside readings, class reports. Offered infrequently. Prereq: FREN 311 and 312.

FREN 432: 3 s.h.**French Prose II**

Short stories, essays and novels by 18th- and 19th- century authors. Works of Voltaire, Rousseau, Diderot, Stendhal, Balzac, Hugo, Flaubert, Maupassant, Zola, etc., will be included. Outside readings, class reports. Offered infrequently. Prereq: FREN 311 and 312.

FREN 433: 3 s.h.**French Prose III**

Essays, short stories and novels from the beginning of the 20th century to the present. Works by Camus, Gide, Malraux, Proust, Sartre, Saint-Exupéry and the "nouveau roman." Outside readings and class reports. Offered infrequently and/or online. Prereq: FREN 311 and 312.

FREN 460: 3 s.h.**Introduction to Translation and Interpretation**

Expert guidance for avoiding the pitfalls inherent in transposing thought from one language to another; for students with a firm oral and written command of French. Emphasis on idiomatic translation of newspaper and magazine articles. Offered infrequently. Prereq: FREN 351 and 352.

FREN 470: 3 s.h.**French Linguistics**

Introduction to linguistics and its terminology in the context of modern French. Study of the major branches of the discipline: phonetics, phonology, syntax, morphology, semantics and sociolinguistics. Review of various French grammar issues from a linguistics perspective. To be taken before FORL 480. Prereq: FREN 351 and 352.

FORL 480: 3 s.h.**Teaching of Foreign Languages**

Study of current theories of second language acquisition and methods of teaching foreign languages in elementary and secondary schools. Students will develop techniques for teaching language for proficiency in all skill areas; planning lessons and units; selecting, adapting and developing materials; assessment; and the use of new technologies. Must be taken simultaneously with EDSE 321, EDSE 340, EDFN 330 and SPED 346. Offered fall. Prereq: admission to Advanced Professional Studies, FREN 470 or GERM 470 or SPAN 470.

FREN 498: 1-3 s.h.**Independent Study**

For further information on independent study, see the *Special Academic Opportunities* section.

Conversation: No Credit

French majors are offered the opportunity to participate on a regular basis in a small conversation group under staff supervision as advertised through the French Circle.

NOTE: The graduate courses in French listed below are open to undergraduates with the recommendation of the advisor and consent of the director of the French graduate program. (See the *Graduate Catalog* for course descriptions.) Undergraduate course number on left corresponds with graduate course number in parentheses.

FREN 486 (586): 3 s.h.**Seminar in 20th-Century Literature****FREN 491 (589): 3 s.h.****Current Topics***German***GERM 101: 3 s.h.****Elementary German I (G1)**

Introduction to language and culture. Fundamentals of grammar and syntax. Oral and written practice, short readings and practice in aural comprehension. Emphasis is placed on learning useful everyday phrases and working toward accuracy in pronunciation. Offered fall, spring.

GERM 102: 3 s.h.**Elementary German II (G1)**

Continuation of GERM 101, with emphasis on more complex syntactical structures while working towards greater proficiency in both productive (speaking and writing) and receptive (reading and listening) skills. Offered spring. Prereq: GERM 101 or 2 years of high school German.

GERM 201: 3 s.h.**Intermediate German I (G1)**

Emphasis is placed on further developing skills through varied realistic exercises and in authentic real-life situations. Contemporary cultural and literary texts provide the thematic basis for oral and written communication. Systematic treatment of grammar. Offered fall. Prereq: GERM 102 or placement exam.

GERM 202: 3 s.h.**Intermediate German II (G1)**

Continuation of GERM 201. Communication in speech and writing. Structures and the vocabulary are studied in greater depth and breadth. Increased emphasis on developing a cross-cultural perspective by comparing the native with the target culture. Systematic treatment of grammar. Offered spring. Prereq: GERM 201 or placement exam.

GERM 211: 3 s.h.**German for Business I (G1)**

Designed to introduce the student to the basic vocabulary and structure of business German. In addition to the employment of the four basic language skills, the course also includes a brief introduction to translation and provides a broad review of German grammar. Offered infrequently. Prereq: GERM 102 or placement exam.

GERM 212: 3 s.h.**German for Business II (G1)**

A continuation of GERM 211. Offered infrequently. Prereq: GERM 201 or 211 or placement exam.

HUMN 220: 3 s.h.**German Literature in English (G1, W)**

German masterpieces taught in English by an instructor of German. Designed primarily as an elective for nonmajors with interest in foreign literature. May be selected by B.A. majors with consent of advisor to fulfill humanities course requirements. Offered fall, spring. Prereq: ENGL 110.

HUMN 230: 3 s.h.**The Amish and Other Pennsylvania Germans (G1)**

The Amish and other Pennsylvania Germans, their history, culture, language and lifestyle, with emphasis on Lancaster County, Pa. Student written and oral reports on historical sites, museums and other subjects. Offered infrequently.

GERM 301: 3 s.h.**Business German**

Advanced study of the four skills and translation. Extensive use of German language audiovisual materials and articles from business periodicals, supplemented by an introduction to business correspondence and grammar. Offered infrequently. Prereq: GERM 202.

GERM 311 and 312: 3 s.h. each**Survey of German Literature I & II**

Orientation to various periods of German literature. Lectures on outstanding literary figures. Reading and discussion of representative work. Offered fall in alternating years. Prereq: GERM 202.

GERM 331 and 332: 3 s.h. each**German Civilization I & II**

An introduction to German culture dealing with the history, economics, philosophy, religion, sciences, education, language, literature, art, architecture, sculpture and music of the German-speaking peoples. Offered spring in alternating years. Prereq: GERM 202 or 351 or 352.

GERM 351 and 352: 3 s.h. each**Composition and Oral Expression I & II (G1, W)**

Systematic practice in the language designed to hone students' oral and written skills to a level of proficiency enabling them to express themselves with a high degree of accuracy and fluency on a variety of topics. Contemporary culture and literature texts provide the thematic basis. Offered fall in alternating years. Prereq: ENGL 110, GERM 202 or placement exam.

GERM 361 and 362: 3 s.h. each**Oral German I and II**

Recommended particularly for secondary education majors, as considerable attention is given to the specific linguistic needs of prospective teachers. Intensive experience with the spoken language. Conversations dealing with everyday life, with emphasis on acquisition of appropriate vocabulary. Emphasis on modern society and customs: schools, sports, holidays, literature, etc. Remedial treatment of phonetics and grammar. Prereq: GERM 202 or equivalent.

GERM 370: 3 s.h.**Advanced Grammar and Stylistics**

A condensed review of basic grammar and its terminology, a systematic and detailed treatment of the basic elements of advanced grammar and an introduction to the basic elements of stylistics. Offered infrequently. Prereq: GERM 351, 352.

HUMN 391: 3 s.h.**Topics in the Humanities (G1, W)**

In-depth investigation and development of a topic of current interest not covered in regularly scheduled courses. The topics will vary according to the needs and interests of the students and the faculty involved. Specific topics will be identified by the subtitles each time the course is offered. Course may be taken for credit each time the content (subtitle) is different. Offered periodically. Prereq: ENGL 110, junior or senior class level.

GERM 432: 3 s.h.**The Novelle and the Novel in German Literature**

Lectures on the principal authors of Novellen from 1870 to the present day. Historical background of the novel. Reading of representative Novellen and at least one novel. Research papers and oral reports. Offered infrequently. Prereq: GERM 311 and 312.

GERM 460: 3 s.h.**Introduction to Translation and Interpretation**

Intended for students with a firm oral and written command of German who need expert guidance for avoiding the pitfalls inherent in transposing thought from one language to another. Emphasis on idiomatic translation of a variety of text types. Introduction to simultaneous oral interpretation. Offered periodically. Prereq: GERM 351 and 352.

GERM 470: 3 s.h.**German Linguistics**

An introduction to basic concepts and major divisions of modern linguistics as it pertains to the description of modern German. Phonetics, phonology, morphology, syntax and semantics seen both diachronically and synchronically. To be taken before or concurrently with FORL 480. Offered fall. Prereq: GERM 351 and 352.

FORL 480: 3 s.h.**Teaching of Foreign Languages**

Study of current theories of second language acquisition and methods of teaching foreign languages in elementary and secondary schools. Based on national standards, students will develop techniques for teaching language for proficiency in all skill areas; planning lessons and units; selecting, adapting and developing materials; assessment; and the use of new technologies. Must be taken simultaneously with EDSE 321, EDSE 340, EDFN 330 and SPED 346. Offered fall only. Prereq: admission to Advanced Professional Studies, GERM 470 or FREN 470 or SPAN 470.

GERM 498: 1-3 s.h.**Independent Study**

For further information on independent study, see the *Special Academic Opportunities* section.

Conversation: No credit

German majors are offered the opportunity to participate one hour per week in a small conversation group with staff supervision.

Special Courses

Graduate German courses listed below are open to undergraduates with recommendation of advisor and consent of the director of the German graduate program. (See the *Graduate Catalog* for course descriptions.) Undergraduate course number on left corresponds with graduate number in parentheses.

GERM 409 (509): 3 s.h.**Applied Linguistics****GERM 416 (512): 3 s.h.****Introduction to Phonetics****GERM 442 (522): 3 s.h.****Composition****GERM 443 (523): 3 s.h.****Stylistics and Composition****GERM 444 (524): 3 s.h.****Translation and Interpretation****GERM 446 (541): 3 s.h.****History of the German-Speaking Peoples to the Congress of Vienna****GERM 447 (542): 3 s.h.****History of the German-Speaking Peoples from the Congress of Vienna to the Present****GERM 451 (551): 3 s.h.****Geography of the German-Speaking Countries, Physical and Economic****GERM 461 (561): 3 s.h.****Survey of German Art****GERM 462 (531): 3 s.h.****Evolution of the German Language****GERM 471 (571): 3 s.h.****Aspects of Contemporary Germany****GERM 484 (584): 3 s.h.****Seminar in the Literature of the Classical Period****GERM 485 (585): 3 s.h.****Seminar in 19th-Century German Literature****GERM 486 (586): 3 s.h.****Seminar in 20th-Century German Literature****GERM 491 (589): 3 s.h.****Current Topics***Ancient Greek***HUMN 163: 3 s.h.****Latin and Greek Terminology (G1)**

A systematic treatment of Latin and Greek components in English words. Study of prefixes, suffixes and roots integrated with the combinative principles, orthography and pronunciation of general and scientific vocabulary. Attention given to the history of the classical element in English. No prior knowledge of Latin and Greek required. Offered infrequently.

HUMN 202: 3 s.h.**Classical Mythology (G1)**

Major mythological materials from Greek and Roman civilization. Analysis and interpretation of myth together with its symbolic, allegorical and psychological implications, and its treatment in art and literature from classical to modern times. Offered annually.

HUMN 391: 3 s.h.**Topics in the Humanities (G1, W)**

In-depth investigation and development of a topic of current interest not covered in regularly scheduled courses. The topics will vary according to the needs and interests of the students and the faculty involved. Specific topics will be identified by the subtitles each time the course is offered. Course may be taken for credit each time the content (subtitle) is different. Offered periodically. Prereq: ENGL 110.

Latin (offered in cooperation with Franklin & Marshall College)

LATN 101: 3 s.h.

Elementary Latin I (G1)

Introduction to the language and culture of ancient Rome. Study of forms, syntax and idioms. Emphasis on analytical thinking and English vocabulary building. Intended for beginners. Offered infrequently.

LATN 102: 3 s.h.

Elementary Latin II (G1)

Continuation of the approach used in the first semester. Supplementary readings in unadapted Latin prose and poetry. Offered infrequently. Prereq: LATN 101.

HUMN 163: 3 s.h.

Latin and Greek Terminology (G1)

Latin and Greek components in English words. Study of prefixes, suffixes and roots integrated with the combinative principles, orthography and pronunciation of general and scientific vocabulary. Attention given to the history of the classical element in English. No prior knowledge of Latin and Greek required. Offered infrequently.

HUMN 202: 3 s.h.

Classical Mythology (G1)

Major mythological materials from Greek and Roman civilization. Analysis and interpretation of myth together with its symbolic, allegorical and psychological implications, and its treatment in art and literature from classical to modern times. Offered annually.

LATN 201: 3 s.h.

Intermediate Latin I (G1)

Review of elementary materials and progression into advanced forms and syntax. Offered infrequently. Prereq: 2 years of secondary Latin or LATN 102.

LATN 202: 3 s.h.

Intermediate Latin II (G1)

Introduction to Latin literature through a variety of classical authors. Offered infrequently. Prereq: LATN 201 or equivalent.

HUMN 391: 3 s.h.

Topics in the Humanities (G1, W)

In-depth investigation and development of a topic of current interest not covered in regularly scheduled courses. The topics will vary according to the needs and interests of the students and the faculty involved. Specific topics will be identified by the subtitles each time the course is offered. Course may be taken for credit each time the content (subtitle) is different. Offered periodically. Prereq: ENGL 110.

Italian (offered as Continuing Education at the downtown campus)

ITAL 101: 3 s.h.

Elementary Italian I (G1)

Introduction to language and culture. Fundamentals of grammar and syntax. Oral and written practice, short readings and practice in aural comprehension. Emphasis is placed on learning useful everyday phrases and working toward accuracy in pronunciation. Offered periodically.

ITAL 102: 3 s.h.

Elementary Italian II (G1)

Continuation of the introduction to language and culture, with emphasis on more complex syntactical structures while working toward greater proficiency in both productive (speaking and writing) and receptive (reading and listening) skills. Offered infrequently. Prereq: ITAL 101 or 1 year of high school Italian.

Japanese (offered as Continuing Education at the downtown campus)

JAPN 101: 3 s.h.

Elementary Japanese I (G1)

Introduction to language and culture. Fundamentals of grammar and syntax. Oral practice, short readings and practice in aural comprehension. Emphasis on learning useful everyday phrases and working toward accuracy in pronunciation. Offered fall.

JAPN 102: 3 s.h.

Elementary Japanese II (G1)

Continuation of JAPN 101; emphasis on more complex syntactical structures while working toward greater proficiency in both productive (speaking and writing) and receptive (reading and listening) skills. Offered spring. Prereq: JAPN 101 or equivalent.

JAPN 201: 3 s.h.

Intermediate Japanese I (G1)

Continuation of JAPN 102. Further development of syntactical and phonological structures. Thematic basis for oral and written communication. Builds on proficiency attained in 101-102 sequence. Offered periodically. Prereq: JAPN 102.

JAPN 202: 3 s.h.

Intermediate Japanese II (G1)

Continuation of JAPN 201. Further development of syntactical and phonological structures. Thematic basis for oral and written communication. Builds on proficiency attained in JAPN 201. Offered infrequently. Prereq: JAPN 201.

Russian (in moratorium, but courses are offered in cooperation with Franklin & Marshall College)

RUSS 101: 3 s.h.

Elementary Russian I (G1)

Introduction to language and culture. Fundamentals of grammar and syntax. Oral and written practice, short readings and practice in aural comprehension. Emphasis is placed on learning useful everyday phrases and working toward accuracy in pronunciation. Offered infrequently.

RUSS 102: 3 s.h.

Elementary Russian II (G1)

Continuation of the introduction to language and culture and further mastery of speaking, comprehension, reading and writing skills. Offered infrequently. Prereq: RUSS 101 or 1 year of high school Russian.

HUMN 270: 3 s.h.

Russian Literature in English (G1, W)

Representative short readings from major Russian writers, covering 19th and 20th centuries in alternating years. Consideration of themes and characteristics of Russian literature as influenced by history, politics and esthetic currents. Designed primarily as an elective for nonmajors; may be elected by majors with the consent of the advisor as a supplement to the department requirements. Evaluation is by written examinations. Offered infrequently. Prereq: ENGL 110.

RUSS 201: 3 s.h.

Intermediate Russian I (G1)

Further development of reading, writing, comprehension and speaking skills, and basic grammar, using contemporary cultural and situational material. Offered infrequently. Prereq: RUSS 102 or 3 years of high school Russian.

RUSS 202: 3 s.h.

Intermediate Russian II (G1)

Continued development of the skills nurtured in RUSS 201. Emphasis on communication in speech and writing, and improved control of grammatical structures, as well as increased vocabulary for daily life and reading. Offered infrequently. Prereq: RUSS 201 or 4 years of high school Russian.

HUMN 370: 3 s.h.

Russian Folk Culture (P)

An examination of Russian culture up to about 1700 with Peter the Great's moves toward Westernization; the essence and foundations of the Russian worldview as conditioned by events and as reflected in religion, arts and crafts, folklore, oral and written literature, daily life and rites of passage. Requirements include a crafts project, papers on aspects of folklore and literature, and written examination. A useful course for education majors. Knowledge of Russian is not required. Offered infrequently. Prereq: COMM 100, ENGL 110, junior status.

HUMN 391: 3 s.h.

Topics in the Humanities (G1, W)

In-depth investigation and development of a topic of current interest not covered in regularly scheduled courses. The topics will vary according to the needs and interests of the students and the faculty involved. Specific topics will be identified by the subtitles each time the course is offered. Course may be taken for credit each time the content (subtitle) is different. Offered periodically. Prereq: ENGL 110.

Spanish

SPAN 101: 3 s.h.

Elementary Spanish I (G1)

Introduction to language and culture. Fundamentals of grammar and syntax. Oral and written practice, short readings and practice in aural comprehension. Emphasis is placed on learning useful everyday phrases and working toward accuracy in pronunciation. Offered fall, spring.

SPAN 102: 3 s.h.

Elementary Spanish II (G1)

Continuation of SPAN 101; emphasis on more complex syntactical structures while working toward greater proficiency in both productive (speaking and writing) and receptive (reading and listening) skills. Offered fall, spring. Prereq: SPAN 101 or 2 years of high school Spanish.

SPAN 201: 3 s.h.

Intermediate Spanish I (G1)

Emphasis is placed on further developing receptive and productive skills through varied realistic exercises and in authentic real-life situations. Contemporary cultural and literary texts provide the thematic basis for oral and written communication. Systematic treatment of grammar. Offered fall, spring. Prereq: SPAN 102 or placement exam.

SPAN 202: 3 s.h.

Intermediate Spanish II (G1)

Continuation of SPAN 201. Communication in speech and writing; grammar and vocabulary are studied in greater depth and breadth. Increased emphasis on developing a cross-cultural perspective. Treatment of grammar and reading comprehension. Offered fall, spring. Prereq: SPAN 201 or placement exam.

SPAN 211: 3 s.h.

Spanish for Business I (G1)

The Spanish language and culture needed to perform basic business transactions in Spanish-speaking countries. Offered infrequently. Prereq: SPAN 102 or placement exam.

SPAN 212: 3 s.h.

Spanish for Business II (G1)

Continuation of SPAN 211. Emphasis on business terminology, commercial correspondence, similarities and differences in business transactions and international procedures. Offered infrequently. Prereq: SPAN 201 or 211, or placement exam.

HUMN 280: 3 s.h.**Spanish Literature in English (G1)**

Outstanding Spanish and Spanish-American literary works. Course taught in English by an instructor of Spanish. Offered periodically.

SPAN 301: 3 s.h.**Commercial Spanish**

Commercial vocabulary and stylistics. Presentation of the parts of the business letter. General types of business correspondence, such as letters requesting and offering information, mail orders, sales letters, applications for employment, complaints, claims, collection, credit, etc. Offered infrequently. Prereq: SPAN 202 or 351, or placement exam.

SPAN 311: 3 s.h.**Survey of Literature I**

Life and works of outstanding literary figures and movements in Spain through the 17th century. Lectures, outside readings and reports. Offered annually. Prereq: SPAN 351 or 352.

SPAN 312: 3 s.h.**Survey of Literature II**

Life and works of outstanding literary figures and movements in Spain from 1700 forward. Lectures, outside readings and reports. Offered annually. Prereq: SPAN 351 or 352.

SPAN 313: 3 s.h.**Survey of Spanish American Literature**

Life and works of outstanding literary figures and movements in Spanish America from its discovery and colonization to the present. Emphasis given to the Latin American contribution to universal literature. Offered annually. Prereq: SPAN 351 or 352.

SPAN 314: 3 s.h.**Survey of Spanish American Literature II**

A panoramic journey through Latin American literature from the beginning of the 20th century to the present. Attention will be given to the development of cultural and aesthetic movements in the socio-historical contexts of Spanish America. Offered annually. Prereq: SPAN 351 or 352.

SPAN 331: 3 s.h.**Spanish Civilization I**

History and development of Spain from prehistoric times to 1700. Includes the civilization, art and influence of the Romans, Visigoths and Moslems; unification of the country and the Hapsburgs. A study of the art of each period. Considerable use of slides and films. Offered annually. Prereq: SPAN 202 or 351.

SPAN 332: 3 s.h.**Spanish Civilization II (D)**

Spanish history and culture from 1700 forward from the beginning of the Bourbon dynasty through the present. Emphasis on the intellectual, social, cultural and political aspects of life in Spain. Outside readings, class reports. Considerable use of slides and films. Offered annually. Prereq: SPAN 202 or 351.

SPAN 333: 3 s.h.**Spanish American Civilization I**

History of pre-Columbian Americans; the conquest, exploration and colonization of the New World to the Wars of Independence. Includes a history of Spanish American cultures, societies and institutions. Use of audiovisual material to emphasize the differences among pre-Columbian civilizations. Offered annually. Prereq: SPAN 202 or 351.

SPAN 334: 3 s.h.**Spanish American Civilization II**

History and culture of the Spanish Americas from 1824 to contemporary times. The formation and development of the new Spanish American countries once they reached their independence from Spain will be explored and analyzed. Emphasis will be given to the traits that make each one of these countries unique as well as part of the Spanish American world. Offered annually. Prereq: SPAN 202 or 351.

SPAN 351 and 352: 3 s.h. each**Composition and Oral Expression I and II (G1, W)**

Systematic practice in the language, designed to hone students' grammar, oral and written skills to a level of proficiency enabling them to express themselves with accuracy and fluency. Extensive grammar review. Prereq for SPAN 351: SPAN 202 or placement exam. Prereq for SPAN 352: SPAN 351, ENGL 110. Offered fall and spring.

SPAN 361 and 362: 3 s.h. each**Oral Spanish I and II**

Intensive experience with the spoken language. Recorded exercises in comprehension. Conversations concerning everyday life, with emphasis on appropriate vocabulary. Emphasis on modern society and customs: schools, sports, holidays, literature, etc. Remedial treatment of phonetics and grammar. Offered spring. Prereq: SPAN 351 or equivalent.

SPAN 371: 3 s.h.**Spanish in the United States (D)**

The history and sociolinguistic aspects of the use of Spanish in the United States, analyzing issues related to language maintenance and loss, contact with English and the identification of varieties of Spanish in the United States. Emphasis will be given to language attitudes and implications for identity and interethnic relations. Offered periodically. Prereq: SPAN 352 or permission of instructor.

HUMN 380: 3 s.h.**Latino Issues of Identity (P)**

Critically examines a variety of poetry, fiction, short stories and essays produced by U.S. Latino/a writers and artists. Analysis of films and newspaper clippings related to the Latino experience will be discussed. Texts examined will be approached not as isolated words on a page, but as part of a living culture with a rich historical context. Interdisciplinary in nature, combining literature with history and cultural studies, but also comparative, since the diversity of cultures will be explored under the rubric of "Latino," which includes Chicanos, Puerto Ricans, Cubans and Dominicans, among others. Knowledge of Spanish not necessary. Offered periodically. Prereq: COMM 100, ENGL 110, junior status.

HUMN 391: 3 s.h.**Topics in the Humanities (G1, W)**

In-depth investigation and development of a topic of current interest not covered in regularly scheduled courses. The topics will vary according to the needs and interests of the students and the faculty involved. Specific topics will be identified by the subtitles each time the course is offered. Course may be taken for credit each time the content (subtitle) is different. Offered periodically. Prereq: ENGL 110.

SPAN 411: 3 s.h.**Spanish Poetry I**

Development of principal types of Spanish or Spanish American poetry from the early Kharjas and Cantar de Mio Cid to the Renaissance. Study of the main works of representative poets. Class discussions, lectures, outside readings and reports. Offered periodically. Prereq: any two of SPAN 311, 312, 313 or 314.

SPAN 412: 3 s.h.**Spanish Poetry II**

Continuing development of Spanish or Spanish American poetry from the Golden Age to the end of the 19th century. Main works of representative poets are studied. Class discussions, lectures, outside readings and reports. Offered periodically. Prereq: any two of SPAN 311, 312, 313 or 314.

SPAN 421: 3 s.h.**Spanish Drama I**

Traces the development of Spanish drama from its beginnings, with a study of representative plays of Spain's Golden Age. Lectures, discussions, outside readings and reports. Offered periodically. Prereq: any two of SPAN 311, 312, 313 or 314.

SPAN 422: 3 s.h.**Spanish Drama II**

A study of the Spanish theatre from 1700 through the 19th century. Includes the neoclassic, romantic and realist dramatists such as Echegaray, Tamayo y Baus and Zomilla. Lectures, discussions, outside readings and reports. Offered periodically. Prereq: any two of SPAN 311, 312, 313 or 314.

SPAN 431: 3 s.h.**Spanish Prose I**

Development of narrative in Spain from the 13th-century origins of these forms to the end of the 17th century. Includes historical, didactic, narrative, pastoral, picaresque, mystic and novels of chivalry. Lectures, discussions, outside readings and reports. Offered periodically. Prereq: any two of SPAN 311, 312, 313 or 314.

SPAN 432: 3 s.h.**Spanish Prose II**

Study of Spanish narrative forms from the 18th century to the present day. Lectures, discussions, outside readings and reports. Offered periodically. Prereq: any two of SPAN 311, 312, 313 or 314.

SPAN 433: 3 s.h.**Spanish American Prose**

A study of Spanish American prose forms—history of discovery, conquest, exploration and colonization, romanticism, realism, naturalism, the essay and fiction to the present day. Lectures, outside readings and reports. Offered periodically. Prereq: any two of SPAN 311, 312, 313 or 314.

SPAN 460: 3 s.h.**Introduction to Translation and Interpretation**

Intended for students with a firm oral and written command of Spanish who need expert guidance for avoiding the pitfalls inherent in transposing thought from one language to another. Emphasis on idiomatic translation of newspaper and magazine articles. Offered spring. Prereq: SPAN 351 and 352.

SPAN 470: 3 s.h.**Spanish Linguistics**

Introduction to Spanish phonetics. Comparative study of the morphology and the syntactic structures of Spanish and English. To be taken before FORL 480. Offered fall. Prereq: SPAN 351 and 352. Recommended: SPAN 361.

FORL 480: 3 s.h.

Study of current theories of second language acquisition and methods of teaching foreign languages in elementary and secondary schools. Students will develop techniques for teaching language for proficiency in all skill areas; planning lessons and units; selecting, adapting and developing materials; assessment; and the use of new technologies. Must be taken simultaneously with EDSE 321, EDSE 340, EDFN 330 and SPED 346. Offered fall. Prereq: admission to Advanced Professional Studies, SPAN 470 or FREN 470 or GERM 470.

SPAN 498: 1-3 s.h.**Independent Study**

For further information on independent study, see the *Special Academic Opportunities* section.

Conversation: No credit

Spanish majors are offered the opportunity to participate on a regular basis in a small conversation group under staff supervision.

NOTE: The graduate courses in Spanish listed below are open to undergraduates with the recommendation of the advisor and consent of the director of the Spanish graduate program. (See the *Graduate Catalog* for course descriptions.) Undergraduate course number on left corresponds with graduate course number in parentheses.

SPAN 409 (509): 3 s.h.

Applied Linguistics

SPAN 443 (523): 3 s.h.

Composition and Stylistics

SPAN 444 (524): 3 s.h.

Translation and Interpretation

SPAN 445 (525): 3 s.h.

Advanced Oral Practice and Self-Expression

SPAN 446 (541): 3 s.h.

History of Spanish Civilization

SPAN 447 (542): 3 s.h.

History of Spanish American Civilization

SPAN 451 (551): 3 s.h.

Geography of Spain, Physical and Economic

SPAN 461 (561): 3 s.h.

History of Hispanic Art

SPAN 462 (531): 3 s.h.

Evolution of the Spanish Language

SPAN 471 (571): 3 s.h.

Aspects of Contemporary Spain

SPAN 472 (572): 3 s.h.

Aspects of Contemporary Spanish America

SPAN 481 (581): 3 s.h.

Seminar in Medieval Spanish Literature

SPAN 482 (582): 3 s.h.

Seminar in Renaissance Literature

SPAN 485 (585): 3 s.h.

Seminar in 19th-Century Literature

SPAN 486 (586): 3 s.h.

Seminar in 20th-Century Literature

SPAN 487 (587): 3 s.h.

Seminar in Spanish American Literature

SPAN 491 (589): 3 s.h.

Current Topics

FRENCH

See Foreign Languages

GEOGRAPHY

College of Science and Technology

Associate Professor Kelly, chairperson
 Professors Cuthbert, Schreiber, Shanahan
 Associate Professor Geiger
 Assistant Professor Frost

Geography is the study of how people relate to their natural and human surroundings. Geography is a bridge discipline, an environmental science which brings together principles of physical sciences and other social sciences; a social science which looks at the spatial characteristics of culture, history, politics, economies and business decisions; and a liberal arts discipline which provides background for study in art, languages, literature, music, education and many other subjects. Geographers can bring to analyses of current issues an understanding of global interrelationships and specialized map-related skills. Many geographers develop professional skills in map interpretation, cartography and computer-based mapping and analysis. Geographic understanding and skills create the

potential for employment in such diverse areas as planning and other government agencies, environmental and cartographic service companies, and the business community. Contact the department chairperson for more detailed information on career opportunities. The liberal arts program in geography offers emphases in environmental studies, global studies and geospatial applications for geography majors and minors. A minor in geography brings an added dimension to any major, and current geography minors hold majors in many different University departments. The program in secondary education, providing certification for social studies teaching with a geography emphasis, is also serving a growing demand. Every student will benefit from the liberal arts value of the introductory and regional geography courses.

COURSE REQUIREMENTS

Geography Major (B.A.): 120 s.h.

Environmental Studies Option

GEOG 120, 202, 230, 281, 295; one from GEOG 14x, 24x, 34x; four from 30x or 33x; one from 37x, 38x, 29x, 39x or 350: Raster GIS & Remote sensing; 300 or 488. Required related courses: MATH 151 or 160; one from MATH 235, BIOL 375, ECON 231 or ENVI 330; one course from BIOL 241, ESCI 101, 104, 107, 109, 221, 225, 245, 261, 322; an approved minor.

Geography Major (B.A.): 120 s.h.

Global Studies Option

GEOG 120, 141, 230, 281; two from GEOG 22x, 350, 32x; three from GEOG 24x, 34x, 44x (not 245); GEOG 300 or 488; 6 s.h. in geography electives. Required related courses: MATH 130 or 235 and two from ANTH 121, 322, 342, 344, ECON 203, 225, 325, 326, 327, GOVT 221, 251, 351, 352, HIST 102; an approved minor.

Geography Major (B.A.): 120 s.h.

Geospatial Applications Option

GEOG 120, 230, 281, 292, 295, 372; one from GEOG 28x, 29x, 38x, 39x; two from GEOG 278, 304, 305, 306, 329, 336, 407; one from GEOG 14x, 24x, 34x, 44x; 300 or 488; 3 s.h. in geography electives. Required related courses: MATH 130 or 235 and MATH 151 or 160; an approved minor.

Social Studies Major (B.S.Ed.): 120 s.h.

This program is designed for students planning to teach economics, geography, government or history. The program consists of 30 s.h. of required core courses, two in economics, geography and government, and four in history. In consultation with an academic advisor, each student will select a concentration totaling 30 s.h. from among the following disciplines: anthropology (0-6), economics (3-15), geography (3-15), government (3-15), history (3-15), psychology (0-6) and sociology (0-6). Economics, government and history courses should be at the 200 level or higher. Students who concentrate in geography are highly encouraged to take 15 s.h. in geography. The program also consists of 27 s.h. of professional education courses, two math courses and two courses in the humanities or sciences that support the concentration.

Students wishing to teach anthropology, psychology or sociology in the secondary schools are required to complete the B.S.Ed. As part of that program, the students should select a number of courses in anthropology, sociology and psychology to prepare for the certification exams in the social sciences. Additional courses beyond the social studies program may be necessary. Upon receiving certification, students can take the test for Social Sciences Certification, which will allow them to teach anthropology, psychology and sociology.

The professional education courses required are EDFN 211, 241 and 330; EDSE 321, 433 and 461.

Geospatial Applications Minor:

18 credits minimum, including GEOG 101, 281, 295; two of GEOG 120, 222, 226, 227, 230, 278, 292, 306, 384; and one 300-level regional geography course (34x).

Environmental Geography Minor:

18 credits minimum, including GEOG 101, 202, 230, 281 and two geography electives at the 300-400 level.

Global Geography Minor:

18 credits minimum, including GEOG 101, 281; two geography electives at the 100-200 level; one 300-level regional geography course; and one 300-level systematic geography course.

General Geography Minor:

18 credits minimum, including GEOG 101, 281 and four geography electives determined with the approval of the geography chairperson, and must include two courses at the 300-400 level.

COURSE DESCRIPTIONS

GEOG 101: 3 s.h.

The Global Environment (G3)

Global survey of human environment interactions focusing on people's use of natural resources and major related issues, including scarcity and environmental impacts. Comparisons between developing and developed countries and across cultures.

GEOG 120: 3 s.h.

Human Geography (G3, D)

Cultural geography of race, ethnicity, gender and political systems. Emphasis on processes that create and maintain cultures and the geographies that these processes produce.

GEOG 141: 3 s.h.

World Regional Geography (G3)

Spatial patterns of environmental, cultural, social, economic and political developments in selected regions of the world. Emphasis on developed and less developed parts of the world.

GEOG 202: 3 s.h.**Resources and the Environment (G3)**

Critical resource and environmental issues of the United States examined. Topics are analyzed from the perspective of interrelatedness and implications for culture and society, development and policy formation. Offered fall, spring.

GEOG 222: 3 s.h.**Economic Geography (G3)**

Location of economic activities in different environmental settings. The growth of global economic interdependence. Economic growth and development strategies in a regional framework. Economic versus environmental trade-offs. Offered summer.

GEOG 226: 3 s.h.**Political Geography (D, G3, W)**

Political boundaries of the world map. Covers violent conflicts from which countries were formed. Colonization (1400-1900), decolonization (1800-1970) and the Cold War are discussed. Offered fall, spring. Prereq: ENGL 110.

GEOG 227: 3 s.h.**Urban Geography (G3)**

External relations and internal structure of urban areas throughout the world. Analysis of economic activities and growth of urban areas; environmental and social problems; public policy demands.

GEOG 228: 3 s.h.**Geography of Sport (G3)**

Using a geographical basis, the course will examine a variety of topics, including landscapes of modern sport; place and space in sport; institutions and spatial organization of sport; and sport, politics and development. Offered periodically.

GEOG 230: 3 s.h.**Physical Geography (G3)**

Study of the earth's physical environment, including atmosphere, hydrosphere, lithosphere and biosphere. Viewing the earth as an integrated system, global patterns and processes are analyzed. Offered annually.

GEOG 245: 3 s.h.**Geography of Pennsylvania (G3)**

Introduction to the geography of Pennsylvania, using the tools and concepts of regional geography. Physical, cultural and economic landscapes and resulting social and environmental issues are examined.

GEOG 248: 3 s.h.**Geography of Africa (G3, D)**

The course uses a thematic approach to examine many of the subfields of geography as they pertain to Africa. Topics include the physical landscape, climate, vegetation, environmental issues, precolonial and colonial history, politics, culture, population, urbanization, agricultural and economic development, medical and gender issues. Offered periodically.

GEOG 278: 3 s.h.**Transportation Geography (G3)**

Transportation is defined as the movement of goods and people from place to place. This course introduces the principles underlying these movements, with discussion of the economic, social and environmental impacts. Offered periodically.

GEOG 281: 3 s.h.**Map Interpretation and Analysis (G3)**

Thorough examination of maps as interpretive and analytical tools for depicting landscapes and conducting geographic research in a digital world. Includes an introduction to Geographic Information Systems (GIS) mapping software.

GEOG 292: 3 s.h.**Quantitative and Spatial Analysis (G3)**

Advanced spatial analytical techniques in a computer environment. Data-collection methods and sources are reviewed. Descriptive and inferential statistical methods are surveyed and are applied to spatial problem solving. Offered periodically. Prereq: GEOG 281.

GEOG 295: 3 s.h.**Geographic Information Systems**

Introduction to Geographic Information Systems (GIS) computer technology and software. Combines understanding of geographic data and research with training in digital mapping, geographic databases and spatial analysis. Offered fall, spring. Prereq: GEOG 281.

GEOG 300, 400: 3 s.h.**Cooperative Education in Geography**

Assignment with a public agency or private organization. Requirements include design of an approved job description relevant to employer's functions and student's program, and a planned program of contact with the faculty supervisor. Performance evaluation by sponsor used in assigning satisfactory/unsatisfactory grade.

GEOG 304: 3 s.h.**Water Resources Management (G3)**

An interdisciplinary study of how we plan, manage and use water. Topics range from water law to hydrology. Offered fall of even years. Prereq: GEOG 101 or 202.

GEOG 305: 3 s.h.**Geography of Energy (G3, W)**

The importance of energy in spatially organizing world politics, economies, societies and cultures is examined. Energy and its attendant benefits and problems are examined as physical and technical phenomena and as social issues. Offered periodically. Prereq: ENGL 110; GEOG 202, GEOG 230 or permission of instructor.

GEOG 306: 3 s.h.**Environmental Impact Assessment**

The various regulatory requirements and technical methods for developing federal environmental-impact statements for air, water, biological and socioeconomic environments. Offered periodically. Prereq: GEOG 202 and 230 or permission of instructor.

GEOG 307: 3 s.h.**U.S. Environmental Policy (G3)**

Federal environmental legislation; the relationship between local, state and federal agencies in policy formation and implementation; industry responsibilities and options under existing law; the role of interest groups and the public in environmental decision making and U.S. engagement in emerging international environmental policy debates. Offered fall of odd years. Prereq: junior or senior status; GEOG 101 or 202 or GOVT 205 or ECON 102 or permission of instructor.

GEOG 321: 3 s.h.**Human Settlement Patterns**

The history, evolution, form and function of human settlement systems in the United States and other selected countries over time. Consideration of policy issues for future settlement patterns. Offered infrequently. Prereq: GEOG 101 or GOVT 101 or 111.

GEOG 329: 3 s.h.**Geography of Recreation and Tourism (G3)**

An investigation of the areal distribution of recreation and tourist activities and their positive and negative impacts; emphasis on environmental and economic aspects of leisure within a locational framework. Planning methodology to alleviate problems and create higher-quality recreational experiences. Offered infrequently.

GEOG 333: 3 s.h.**Biogeography (G3)**

Interactions between environmental, biological and human factors which have led to current geographical distributions of flora and fauna. Field trip required. Offered periodically. Prereq: GEOG 230 or BIOL 100 or permission of instructor.

GEOG 336: 3 s.h.**Climate and Society (G3)**

Human interrelationships with the atmospheric environment. Includes microclimatological applications in water resources, human health and architecture to analysis of global climate-change issues. Offered periodically. Prereq: GEOG 230 or ESCI 107 or permission of instructor.

GEOG 342: 3 s.h.**Europe (G3, W)**

Introduction to Western Europe as a region. Emphasis on its delimitation and cultural, economic and political spatial patterns relating to the desire to form a European community. Europe within a global framework also considered. Offered winter, spring, summer. Prereq: ENGL 110.

GEOG 343: 3 s.h.**Latin America (P)**

Contemporary economic, social and environmental issues. Topics include population growth, land-use changes, industrialization, urbanization and regional ecological changes. Offered periodically. Prereq: COMM 100; ENGL 110; GEOG 101 or 202; GEOG 141 or 120; and junior or senior status.

GEOG 344: 3 s.h.**North America (G3)**

Geography of the U.S. and Canada using the tools and concepts of regional geography. Physical, population and economic patterns are merged in developing an understanding of regional characteristics and issues.

GEOG 346: 3 s.h.**Pacific Asia (G3)**

Examination and comparison of environmental, social/cultural, economic and political issues in the Pacific Asian region; contrasts between developed Japan and less developed countries of East and Southeast Asia; role of the region in the global economy. Offered infrequently.

GEOG 350: 3 s.h.**Global Issues (G3)**

Issues related to urban, cultural and resource problems are analyzed globally. Emphasis on spatial nature of these problems and emerging global interdependence. Focus on a single current issue, which will be identified in advertised course title. Offered periodically.

GEOG 372: 3 s.h.**Urban and Regional Planning (G3)**

Introduction to land use and other types of planning in urban and rural areas. Assessment of development suitability and environmental impact. Techniques for implementing different types of plans. Offered periodically.

GEOG 384: 3 s.h.**Cartography**

Introduction to concepts and techniques of mapmaking. Skill developed in computer-based compilation, layout and lettering of maps. Offered periodically. Prereq: GEOG 281, 295.

GEOG 395: 4 s.h.**Advanced GIS**

Advanced experience with Geographic Information Systems (GIS) concepts and software. Emphasis on environmental and planning applications and organizational consideration. Offered periodically. Prereq: GEOG 295 or ESCI 281.

GEOG 407: 3 s.h.**Global Environmental Policy and Negotiation (G3, W)**

Global political and economic forces and environmental change. Emphasis on spatial patterns and processes of transboundary environmental problems, the major pieces of international environmental policy, the negotiations process between states and nonstate actors in policy formation and implementation, and the dynamics of North-South relations on the changing physical landscape. Offered spring of even years. Prereq: junior or senior status; ENGL 110, GEOG 307 or permission of instructor.

GEOG 488: 3 s.h.**Senior Thesis**

Investigation of selected topic with individual research assignment; focus varies but related to environmental analysis. Prereq: senior standing and completion of basic courses. Offered as needed.

GEOG 489, 499: 1-3 s.h.**Honors Courses/Thesis**

Investigation of selected topic with individual research assignment; focus varies but related to environmental analysis. Prereq: senior standing and completion of basic courses and eligibility for departmental honors. See *Special Academic Opportunities, Departmental Honors* section of this catalog.

GEOG 498: 3 s.h.**Independent Study in Geography**

Investigation of selected topic with individual research assignment; focus varies.

GEOLOGY

See Earth Sciences

GERMAN

See Foreign Languages

GERONTOLOGY

Assistant Professor Bethel, coordinator

The interdepartmental minor in gerontology is intended to help prepare students to function at the entry level in the rapidly developing field of services to the aging, and to relate and work with elderly people in general social work environments. In combination with any of several baccalaureate degrees, it facilitates an appreciation of the special strengths and needs of the elderly, and the range of services and problems that relate to them.

COURSE REQUIREMENTS**Interdepartmental Minor in Gerontology: 18 s.h.**

GERT 100, SOWK 315; one of the following courses: NURS 316, NURS 350, PHIL 280, PSYC 229, SOCY 210, SOWK 306. Other topics/courses approved by the program coordinator. Offered spring of even years.

COURSE DESCRIPTIONS**GERT 100: 3 s.h.****Interdisciplinary Introduction to Gerontology (G3)**

An introduction to the field of aging and examination of the physiological, sociological, psychological and economic perspectives. This course also focuses on problems of the aged at levels of self, interactions with others and the broader societal context. Offered spring of even years.

GOVERNMENT & POLITICAL AFFAIRS

College of Arts, Humanities and Social Sciences

Professor Glenn, chairperson

Professors K. Bookmiller, R. Bookmiller

Associate Professors Bagchi, Greenawalt, Lawrence

Assistant Professor Owen

The Department of Government & Political Affairs offers a liberal arts major and minor. Departmental honors option is available to qualified majors, as are prelaw advising and internship opportunities.

ADMISSION REQUIREMENTS

New students (freshmen and transfers) may be admitted to the Government & Political Affairs major by the Office of Admissions upon admission to the University. Admission into the Government & Political Affairs major from other majors at the University is upon approval of the Department of Government & Political Affairs. Such students must have a cumulative GPA of 2.0 or higher to be admitted into the major.

COURSE REQUIREMENTS

Government & Political Affairs (B.A.): 120 s.h.

Complete both A and B:

A. 36 s.h. in government and political affairs, including 18 s.h. at the 300 level or above. Students must complete the four core classes (GOVT 111: Introduction to American Government; GOVT 221: Introduction to Comparative Political Systems; GOVT 231: Introduction to Political Theory; and GOVT 251: Introduction to Global Affairs), earning a C- or better in each. Of the 18 s.h. at the 300 level or above, at least 6 s.h. must be in capstone (400-level) courses in the major, taken after the student has earned 75 total credits and 24 GOVT credits. (Note: Neither internships nor GOVT 408 qualifies as a capstone course.) Students must earn a C- or better in each of the capstone courses.

Students should check the course description portion of the catalog for prerequisites and recommended courses.

Students planning to attend graduate school in government and political affairs should complete GOVT 401: Political Research Skills and Methods.

Students planning to attend law school should complete GOVT 314: The American Judiciary; GOVT 411: Constitutional Law: Federalism and Separation of Powers; and GOVT 412: Constitutional Law: Civil Rights and Civil Liberties.

B. Students must complete any University-approved minor (18 s.h.). A second major will also fulfill this requirement.

Social Studies Major (B.S.Ed.): 120 s.h.

This program is designed for students planning to teach economics, geography, government or history. The program consists of 30 s.h. of required core courses, two courses in economics, geography and government, and four in history. In consultation with an academic advisor, each student will select a concentration totaling 30 s.h. from the following disciplines: anthropology (0-6), economics (3-15), geography (3-15), government (3-15), history (3-15), psychology (0-6) and sociology (0-6). Economics, geography, government and history courses should be taken at the 200 level or higher. Students who concentrate in government are highly encouraged to take 15 s.h. in government. The program also consists of 27 s.h. of professional education courses, two math courses and two courses in the humanities or sciences that support the concentration.

Students wishing to teach anthropology, psychology or sociology in the secondary schools are required to complete the B.S.Ed. As part of that program, students should select a number of courses in anthropology, sociology and psychology to prepare for the certification exams in the social sciences. Additional courses beyond the social studies program may be necessary. Upon receiving certification, students can take the test for Social Sciences Certification, which will allow them to teach anthropology, psychology and sociology.

The professional education courses required are EDFN 211, 241 and 330; EDSE 321, 433 and 461.

Government & Political Affairs Minor: 18 s.h.

18 s.h. with at least one course in each of the two following areas: American politics and international/comparative politics. 6 s.h. at the 300 level or above are required.

COURSE DESCRIPTIONS

GOVT 101: 3 s.h.

Introduction to Political Studies (G3)

Fundamental problems of politics and government. The involvement of human beings in the exercise of power and influence, conflict, political leadership and political groups. Offered fall, spring.

GOVT 111: 3 s.h.

Introduction to American Government (G3)

Introduction to the major tenets of the American political system. Offered fall, spring.

GOVT 112: 3 s.h.

Introduction to State and Local Government (G3)

The federal system and state and local governmental problems. Emphasis on Pennsylvania when possible. Offered fall, spring.

GOVT 205: 3 s.h.

Introduction to Public Policy (G3)

Decision making by governments in response to public problems. The policy process. Current policy issues, selected from such possible examples as education, abortion, energy and environment. Some problems of policy evaluation. Offered fall.

GOVT 215: 3 s.h.

The American Presidency (G3, W)

Examination of the presidency and the executive branch of national government. Emphasis on the growth and development of presidential power. Offered spring. Prereq: ENGL 110.

GOVT 221: 3 s.h.

Introduction to Comparative Political Systems (G3)

Introduction to the comparative analysis of government and politics through an examination of different political systems, including advanced democracies and developing nations. Offered fall, spring.

GOVT 231: 3 s.h.**Introduction to Political Theory (G3)**

Representative philosophers and concepts in the history of Western political theory from antiquity through the 19th century. Offered fall, spring.

GOVT 241: 3 s.h.**Public Administration and the Public Service (G3, W)**

A study of intergovernmental relations, organizational theory, decision making, personnel, management, budgeting, program evaluation and policy analysis. Offered fall, spring. Prereq: ENGL 110. Recommended: GOVT 111.

GOVT 251: 3 s.h.**Introduction to Global Affairs (G3)**

The nation-state system. Military, political, economic, organizational and legal relations among states. Power and the pursuit of national goals. Offered fall, spring.

GOVT 401: 3 s.h.**Political Research Skills and Methods**

The logic of scientific methods in political science. The development of empirical theory, explanation and causation, formation of concepts, hypothesis testing, problems of political research. Offered fall. Prereq: 60 credit hours must be completed prior to enrollment in GOVT 401.

GOVT 312: 3 s.h.**American Political Parties and Interest Groups (G3, W)**

Comparative studies of interest groups. Intergroup rivalry and conflict. Tensions between parties. Offered fall. Prereq: ENGL 110. Recommended: GOVT 111.

GOVT 314: 3 s.h.**The American Judiciary (G3, W)**

Examination of state and federal courts. Primary emphasis on federal courts and especially the U.S. Supreme Court. Offered fall, spring. Strongly recommended: GOVT 111.

GOVT 315: 3 s.h.**Congress and Lawmaking (G3, W)**

A study of the organization, rules and procedures of the Senate and House of Representatives, and extensive analysis of the internal and external environment for policymaking by Congress. State legislatures are also examined in the same manner. Offered spring. Prereq: ENGL 110. Recommended: GOVT 111.

GOVT 323: 3 s.h.**Government and Politics of the Middle East (D, G3)**

Examination of Middle Eastern politics, including the political systems of Israel, the Palestinian national movement, Iraq, Jordan, Saudi Arabia and Iran. It assumes a comparative approach toward several regional issues, such as terrorism, the Palestinian-Israeli conflict, Islamic fundamentalism and the peace process. The impact of national, economic, gender and religious perspectives upon the region's politics will also be addressed. GOVT 221 recommended. Offered annually.

GOVT 325: 3 s.h.**Politics of East Asia (G3)**

Introduction to the politics of China, Japan and Korea, with emphasis on political institutions, formal and informal political processes, political culture, major issues in each country and their economic significance. Offered spring.

GOVT 327: 3 s.h.**Canadian Government and Politics (P)**

Government and politics of Canada and an examination of how its geography, history, economics and culture have affected its governance. Consideration of major policy issues and their impact on Canada's future. Offered every other fall. Prereq: COMM 100, ENGL 110 and junior status.

GOVT 331: 3 s.h.**Modern Political Thought (W)**

Examines political thinkers from Machiavelli to Nietzsche, including, among others, Hobbes, Locke, Marx and Hume. It will explore questions regarding human nature, the feasibility of an ideal state, the definition of principles such as freedom and equality, and the tensions among such principles. Prereq: GOVT 111, 231.

GOVT 332: 3 s.h.**Recent Developments in Political Theory**

Selected issues and problems and an examination of the works of various contemporary political theorists. Offered spring. Prereq: GOVT 231.

GOVT 333: 3 s.h.**American Political Thought**

Study of the history and development of democracy in an American setting. Emphasis on different and often conflicting versions of democratic theory and practice. Offered fall. Recommended: GOVT 231.

GOVT 341: 3 s.h.**Introduction to City Planning (P)**

Study of the dynamics of human settlement patterns in the country and abroad. Examines public policy alternatives regarding land use and development patterns. Introduces methods and techniques used in designing settlement systems and studies values reflected in human settlement patterns. Offered every other spring. Prereq: COMM 100, ENGL 110 and junior status.

GOVT 351: 3 s.h.**International Law**

Classical sources and recent developments in international law. Evaluation of law in the context of world politics. Offered fall. Recommended: GOVT 251.

GOVT 352: 3 s.h.**International Organizations (G3)**

Study of various intergovernmental and nongovernmental associations representing a number of multinational groupings serving humanitarian, economic and security functions. Emphasis on organizations such as the United Nations and the European Union. Offered spring. Recommended: GOVT 251.

GOVT 355: 3 s.h.**American Foreign Policy (G3)**

Institutional and historical overview of American foreign policy. Formal, informal and institutional sources of foreign policy. Emphasis on post-WWII presidential administrations. Offered fall. Recommended: GOVT 111 or GOVT 251.

GOVT 361: 3 s.h.**The Politics of Race and Ethnicity (G3, D)**

Examination of the role of racial and ethnic minority groups in American politics and government. Focus on political resources and political status of minority groups in America, minority group representation and participation in American politics, the racial divide in American public opinion, racial politics in America's cities and strategies of minority political empowerment. Offered spring. Prereq: GOVT 111.

GOVT 408: 3 s.h.**Seminar in Political Science**

Analysis of critical problems in the discipline. Research and preparation of a written report. Seminar may be taken for credit more than once, provided content is different each time. Offered periodically.

GOVT 411: 3 s.h.**Constitutional Law: Separation of Powers and Federalism**

Focus on the allocation of power between branches and among levels of government as interpreted through significant cases of the U.S. Supreme Court. Offered fall. Prereq: GOVT 111. Strongly recommended: GOVT 314.

GOVT 412: 3 s.h.**Constitutional Law: Civil Rights and Civil Liberties**

Focus on individual rights and liberties protected by the U.S. Constitution and Bill of Rights as interpreted through significant cases of the U.S. Supreme Court. Offered spring. Prereq: GOVT 111. Strongly recommended: GOVT 314.

GOVT 421: 3 s.h.**Democratic Transitions and Trends (W)**

In-depth investigation into democratic transitions and trends that emerge during the transitional process. Prereq: GOVT 251.

GOVT 431: 3 s.h.**Literature and Politics (W)**

This is a GOVT capstone course. It takes one work of fiction, a particular writer or a number of different works of fiction which are thematically connected, and examines the political, social, economic and cultural questions and issues embedded in these works. Well-crafted works of political fiction are often the best gateway to politics, since they use a fictional reality to discuss real problems and concepts. Uses works of fiction along with political writings, speeches, articles and texts to enable one to identify and answer the great political questions of generations. Prereq: C- or better in GOVT 111, 231. Restricted to juniors and seniors only.

GOVT 455: 3 s.h.**U.S.-Middle East Foreign Relations**

Designed as an institutional, historical and contemporary overview of American foreign policy in the Middle East. While key events and political processes equated with the post-World War II period will be examined, the focus of GOVT 455 will be on current U.S. interests and policies within the region. Past events will be utilized to underscore their contemporary political relevance to U.S. policymakers. Specifically, American policy vis-à-vis Israel, the Palestinian national movement, Jordan, Egypt, Iran, Iraq, Saudi Arabia, Afghanistan, Turkey and Syria will be explored in detail. Prereq: GOVT 355. Offered spring.

GOVT 498: Variable Credit**Independent Study**

For further information on independent study, see the *Special Academic Opportunities* section.

GRAPHIC COMMUNICATION TECHNOLOGY

See Applied Engineering, Safety & Technology

GRAPHIC & INTERACTIVE DESIGN

See Art & Design

HISTORY

College of Arts, Humanities and Social Sciences

Professor Frankum, chairperson

Professor Downey

Associate Professors Kevorkian, Khiterer, McLarnon, Weis

Assistant Professors Adyanga, Davis, Maxwell, Shelor, Sommar

The Department of History offers courses in U.S. and world history and major degrees in both the liberal arts and secondary education. A history minor is also available to the nonhistory majors. The department's program in secondary education provides teaching certification. Academic counseling is available for students choosing careers in history.

COURSE REQUIREMENTS

History Major (B.A.): 120 s.h.

HIST 101, 102, 105, 106, 406. Then 27 s.h. of history electives according to departmental guidelines, with at least 9 s.h. of these at the 300 level or above.

History Minor: 18 s.h.

Students who choose a minor in history are required to take a minimum of 18 s.h. of history courses distributed according to departmental guidelines.

General Guidelines for the Minor

- Each minor shall consist of a minimum of 18 s.h. of history courses.
- At least two courses must be taken in U.S. history.
- At least two courses must be taken in world history.
- No more than three 100-level courses may be taken.
- At least two courses at the 300-or-above level must be taken.

Social Studies (B.S.Ed.): 120 s.h.

This program is designed for students planning to teach economics, geography, government or history. The program consists of 30 s.h. from required core courses, two courses in economics, geography and government, and four in history. In consultation with an academic advisor, each student will select a concentration totaling 30 s.h. from the following disciplines: anthropology (0-6), economics (3-15), geography (3-15), government (3-15), history (3-15), psychology (0-6) and sociology (0-6). Economics, geography, government and history courses should be 200 level or above, unless otherwise noted. Students who concentrate in history are highly encouraged to take 15 s.h. in history. The program also consists of 33 s.h. of professional education courses, two math courses and two courses in the humanities or sciences that support the concentration.

Students wishing to teach anthropology, psychology or sociology in the secondary schools are required to complete the B.S.Ed. As part of that program, students should select a number of courses in anthropology, sociology and psychology to prepare for the certification exams in the social sciences. Additional courses beyond the social studies program may be necessary. Upon receiving certification, students can take the test for Social Sciences Certification, which will allow them to teach anthropology, psychology and sociology.

The professional education courses required are EDFN 211, 241 and 330; SPED 346; EDSE 321, 340, 433, 461 and 471.

Dual Certification in Secondary/K-12 Area of Concentration and Special Education: an 18-credit program (on top of credits needed within the BSE major) designed to prepare students for certification in their BSE subject area AND special education. Additional courses can be completed in winter and summer of the senior year.

Department Honors

Minimum of 18 s.h. of history courses and approval of department chair required to submit an honors thesis.

COURSE DESCRIPTIONS

HIST 101: 3 s.h.

Europe and the World, 1350-1789 (G3)

Europe and its world relationships during the centuries of the Reformation, the scientific revolution, overseas expansion and revolution. Offered fall, spring.

HIST 102: 3 s.h.

Europe and the World, 1789 to Present (G3)

Europe and its world relationships in the age of industrialization and democratization. Offered fall, spring.

HIST 105: 3 s.h.

Introduction to the Craft of History (W)

This course introduces students to the philosophy of history, major schools of historiography and skills of research and writing history. This course does not count for general education, G3 requirements. Offered fall, spring. Prereq: ENGL 110.

HIST 106: 3 s.h.

Contours of U.S. History (G3)

A survey of United States history from the peopling of the Americas to the present. Identifies and examines the key themes in the creation and transformation of the nation and its peoples. Offered fall, spring.

HIST 107: 3 s.h.**Pre-Modern World Cultures (G3)**

General survey of world history and culture from known beginnings to 1500. Intended for nonmajors. Offered periodically. Equivalent course, HIST 206. No credit given if credit earned for HIST 206. Offered annually.

HIST 206: 3 s.h.**The World to 1500 (D, G3, W)**

Survey of world history from known beginnings to 1500. Offered annually. Prereq: ENGL 110.

HIST 210: 3 s.h.**Women and Western Civilization (G3)**

History of women in Europe. Ideas about women, education, suffrage and feminist movements, and economic and family roles. Offered periodically.

HIST 214: 3 s.h.**History of Christianity (G3, D)**

Examines the formation of early Christianity, the spread of Christianity from the Roman Mediterranean through Asia, Africa and Europe, and the major issues of European Reformation. Offered fall, spring.

HIST 221: 3 s.h.**England to 1688 (G3)**

Medieval, Tudor and Stuart England: the political, social, economic and cultural development of England from early medieval times to 1688. Offered periodically.

HIST 222: 3 s.h.**Modern Britain (G3)**

Modern England: the political, social, economic and cultural evolution of England from 1688 to the present. Offered annually.

HIST 223: 3 s.h.**Traditional Germany (G3, W)**

The evolution of the German people and their political, cultural and socioeconomic institutions from Roman times to 1806. Offered annually. Prereq: ENGL 110.

HIST 224: 3 s.h.**Modern Germany (G3, W)**

German history from 1806 to the present. Offered annually. Prereq: ENGL 110.

HIST 230: 3 s.h.**Modern Jewish History (G3, W)**

Survey of the history of Jews in the mid-18th through 20th centuries. Course designed to enrich students' historical and cultural knowledge, and improve students' understanding of Gentile-Jewish relations in the modern world. Offered periodically. Prereq: ENGL 110.

HIST 241: 3 s.h.**Imperial Russia (G3, W)**

Political, cultural, economic and social history from Peter the Great to the Russian Revolution. Offered annually. Prereq: ENGL 110.

HIST 242: 3 s.h.**Soviet Union (G3)**

Political, cultural, economic and social history from the Russian Revolution to the present. Offered annually.

HIST 244: 3 s.h.**History of Eastern Europe**

The historical development of the nations of East Central Europe in their larger European context. Offered periodically.

HISTORY 250: 3 s.h.**Women in U.S. History (G3, W)**

History of women in the United States from the early 16th century through the late 20th century, with a particular emphasis on the significance of race, class, religion and region in the shaping of women's experiences. Offered periodically. Prereq: ENGL 110.

HIST 251: 3 s.h.**History of Violence in the United States (G3)**

The historical roots of violence as well as the social and cultural significance of violence in American history. Offered periodically.

HIST 255: 3 s.h.**Religion in American History (G3)**

The role of religion in American history and society, from Native American beginnings and European colonization through the 20th century. Offered periodically.

HIST 260: 3 s.h.**History of Pennsylvania (G3)**

Historical development and contributions of Pennsylvania from colonial beginnings to the present. Offered periodically.

HIST 270: 3 s.h.**History of American Political Parties (G3)**

Formation/historical analysis of American political parties. Offered periodically.

HIST 271: 3 s.h.**The American Presidency (G3)**

A historical study of the growth and development of presidential leadership and power. Offered periodically.

HIST 272: 3 s.h.**African-American History I (G3, W)**

History of African Americans from their first arrival in the Americas through the Civil War, with particular emphasis on the process of enslavement, the formation of African-American communities and institutions, and the evolution of Black abolitionism. Offered annually. Prereq: ENGL 110.

HIST 273: 3 s.h.**African-American History II (G3, W)**

History of African Americans from the Civil War through the present, with particular emphasis on the processes of emancipation, urbanization and enfranchisement. Offered annually. Prereq: ENGL 110.

HIST 276: 3 s.h.**History of American Foreign Relations, 1890 to the Present (G3, W)**

With the rise of the United States as an international power in the 1890s through its current foreign policy initiatives, it has acted as a leader in the world community. This course examines the rise, decline and resurrection of the United States as a world power through its foreign relations. Offered annually. Prereq: ENGL 110.

HIST 280: 3 s.h.**Pre-Colonial Africa (G3)**

Examines major social, economic and political developments in pre-colonial African societies. It begins with an overview of historiographical debates of African history, the peopling of Africa, early migration, agricultural innovation, and climatic changes to the development of civilizations and cross-cultural contacts. Offered annually.

HIST 281: 3 s.h.**African History (G3)**

A survey of African history; special emphasis on the period since 1500. Offered annually. Prereq: ENGL 110.

HIST 283: 3 s.h.**Colonial Latin America (G3, W)**

From pre-Columbian America to the independence of Latin America (1825). Offered annually. Prereq: ENGL 110.

HIST 284: 3 s.h.**Modern Latin America (G3, W)**

Continuation of HIST 283 from 1826 to the present. Offered annually. Prereq: ENGL 110.

HIST 290: 3 s.h.**The Far East in Modern Times**

The cultural, political and socioeconomic traditions of China, Japan, Korea and Southeast Asia, and the results of Western impact upon them in the 19th and 20th centuries. Offered periodically.

HIST 291: 3 s.h.**Modern Middle East (G3, W)**

Covers 1500 to the present, with special emphasis on the period after 1850. Offered periodically. Prereq: ENGL 110.

HIST 308: 3 s.h.**Topics (G3)**

A thematic investigation of a significant historical topic, with course structure and topic determined by the instructor prior to the preregistration period. Offered periodically.

HIST 313: 3 s.h.**History of the Middle Ages (G3, W)**

Major political, cultural and socioeconomic developments in Europe, c. 500-1300 A.D. Offered annually. Prereq: ENGL 110.

HIST 314: 3 s.h.**The Crusades (D, G3)**

The history of the European Crusade movement to the Levant, as it was then called. The course will not concentrate on military history, but rather on the social, cultural and political factors that led to and resulted from these expeditions. The course will consider these issues from the point of view of the several groups of people, European and West Asian, who were involved in these events. Offered annually.

HIST 320: 3 s.h.**Renaissance and Reformation (G3, W)**

Cultural, social and political history of Europe, 1300-1650, with emphasis on Renaissance arts and literature and 16th-century religious upheaval. Offered periodically. Prereq: ENGL 110.

HIST 330: 3 s.h.**19th-Century Europe (G3, W)**

The history of 19th-century Europe, including social, political, intellectual, cultural, religious and economic history. Offered periodically. Prereq: ENGL 110.

HIST 334: 3 s.h.**Victorian England (G3, W)**

The political, social, economic and intellectual development of England and the British Empire from the end of the Napoleonic wars to the outbreak of World War I. Offered periodically. Prereq: ENGL 110.

HIST 340: 3 s.h.**20th-Century Europe (G3, W)**

The political, socioeconomic, cultural and diplomatic transformation of Europe, 1900 to the present. Offered periodically. Prereq: ENGL 110.

HIST 342: 3 s.h.**Hitler and Nazism (G3, W)**

The origins, development and impact upon Germany and the rest of the world of National Socialist theory and practice. Offered annually. Prereq: ENGL 110.

HIST 351: 3 s.h.**17th-Century British America (G3, W)**

The founding and growth of the British Colonies to the Glorious Revolution of 1688, with particular attention devoted to society, beliefs and government. Offered annually. Prereq: ENGL 110.

HIST 352: 3 s.h.**Provincial and Revolutionary America, 1689-1789 (G3, W)**

America from the Glorious Revolution to the completion of the American Revolution, with particular attention to social, cultural and political developments such as the Enlightenment, the Great Awakening and the War for Independence. Offered annually. Prereq: ENGL 110.

HIST 354: 3 s.h.**The New Nation (G3, W)**

The United States 1789-1850: The formation of a national vision and culture; the development of political parties; the market revolution and social turmoil; westward movement, sectionalism and reform, including abolitionism and the women's movement. Offered annually. Prereq: ENGL 110.

HIST 355: 3 s.h.**Civil War and Reconstruction (G3, W)**

The social, political and economic causes of the Civil War, the military and social events of the war, and the postwar developments of Reconstruction, with particular emphasis on the place of African Americans in U.S. society. Offered annually. Prereq: ENGL 110.

HIST 356: 3 s.h.**The New Era, 1876-1919 (G3, W)**

Responses to industrialization from populism through the progressive era; changes in thought and culture; World War I and American society; the rise of America as a world power. Offered annually. Prereq: ENGL 110.

HIST 357: 3 s.h.**Modern U.S. History (G3)**

The United States from 1919 to the present. Offered annually.

HIST 360: 3 s.h.**The Second World War (G3)**

The course focuses on the military strategy and tactics employed by the combatants during the Second World War (1939-1945). Offered annually.

HIST 365: 3 s.h.**The Nightmare Years: America 1954-1974 (G3, W)**

Examines social and political movements between the 1954 Brown decision and the resignation of Richard Nixon in 1974. Offered periodically. Prereq: ENGL 110.

HIST 380: 3 s.h.**U.S.-Latin American Relations (G3)**

Traces the historical evolution of the inter-America organizations. Emphasis on U.S.-Latin American relations. Offered infrequently.

HIST 381: 3 s.h.**History of West Africa to 1800 (G3, W)**

Explores the internal dynamics of state formation in the medieval era, the development of sociopolitical and economic institutions, as well as the development and impact of such external factors as Islam, Christianity and the trans-Atlantic slave trade. Offered periodically. Prereq: ENGL 110.

HIST 383: 3 s.h.**European Imperialism in Africa (G3, W)**

Provides an informed understanding of major themes in late 19th- and early 20th-century Africa, with a particular focus on the impact of British, French, Belgian and German imperialism. Special attention will be given to the discussion of the historiography of imperialism related to Africa. Contemporary Africa will be used to provide a background for assessing the effect of imperialism on African society, politics and economies. Offered annually. Prereq: ENGL 110/110H.

HIST 388: 3 s.h.**20th-Century Africa (G3, W)**

Course surveys major developments in 20th-century Africa by situating them in their respective historical contexts. It examines the idea of race, cultural representation of others, colonial economic relations, decolonization, national liberation movements, debts, structural adjustment programs, democracy, post-apartheid South Africa, the emergence of U.S. Africa Command (AFRICOM) and human rights and development. Offered periodically. Prereq: ENGL 110.

HIST 401: 3 s.h.**Cultural Interactions in the Atlantic World, 1450-1820 (P)**

This perspectives course will compare the social, economic, political and religious relations of three areas: Africa, Europe and the native societies of the Americas in and during the period of the formation of the Atlantic World. Offered periodically. Prereq: COMM 100, ENGL 110 and junior status.

HIST 406: 3 s.h.**Senior Seminar**

Students will prepare and defend a seminar paper of approximately 25 pages. Prereq: HIST 105 with a grade of C- or higher; junior or senior standing or permission of instructor. Satisfies advance writing (AW) requirement if a grade of B or higher is attained. Offered fall, spring.

HIST 410: 3 s.h.**European Cultural and Intellectual History (G3)**

History of European philosophy, political and social thought, and arts and literature from the Enlightenment to the present. Offered infrequently.

HIST 453: 3 s.h.**Colonial PA German Society (P)**

Early Pennsylvania became home to a variety of groups in the course of the 18th century. This course takes a trans-Atlantic approach as it explores the diverse backgrounds of European settlers, especially Germans, and the Native Americans whom they encountered. Offered periodically. Prereq: COMM 100, ENGL 110 and junior status.

HIST 456: 3 s.h.**Intellectual and Cultural History of the U.S. (G3, W)**

The intellectual ideas and cultural trends that have helped shape American history. Offered periodically. Prereq: ENGL 110.

HIST 458: 3 s.h.**United States Social History (G3, W)**

A thematic survey of American social development since colonial times. Offered annually. Prereq: ENGL 110.

HIST 470: 3 s.h.**The Vietnam War (P)**

The Vietnam War continues to be one of the more controversial moments in the history of the United States. Course examines the war with the objective of achieving a greater understanding of why the United States entered into the conflict and how the war was fought on the military battlefields in Vietnam and political battlefields in Washington, D.C., Saigon, Hanoi and around the world. Offered annually. Prereq: COMM 100, ENGL 110 and junior status.

HIST 480: 3 s.h.**History of Medicine (G3)**

The history of medicine, health and disease, including political, social, cultural, religious and economic factors from the ancient world to the present. The course includes material from European, American and world perspectives. Offered periodically.

HIST 490: 3 s.h.**Community and Culture in 17th-Century Anglo-America (P)**

This perspectives course introduces students to the use of anthropological methods in studying past societies through examinations of small communities in England and America. Offered annually. Prereq: COMM 100, ENGL 110 and junior status.

HIST 494: 3 s.h.**Perspectives on the Harlem Renaissance (P)**

Interdisciplinary perspectives on the burst of creativity in African-American literature, theatre, musical revues, painting and film known as the Harlem Renaissance. Course is team-taught by faculty from English, history and music. Offered periodically. Prereq: COMM 100, ENGL 110 and junior status.

HIST 498: 1-3 s.h.**Independent Study**

For further information on independent study, see the *Special Academic Opportunities* section.

GRADUATE-LEVEL COURSES

The following 500-level courses are open to qualified undergraduates with permission. Students should check with the department for further information.

HIST 501

Readings in United States History, Beginnings to 1815

HIST 502

Readings in United States History, 1815-1919

HIST 503

Readings in United States History, 1919 to the Present

HIST 505

Readings in Early Modern Europe, 1500-1789

HIST 506

Readings in the European Age of Revolution, 1789-1914

HIST 507

Readings in Modern Europe, 1914 to the Present

HIST 510

Topics in United States History

HIST 511

Topics in European History

HIST 512

Topics in Regional History

HIST 520

Historical Methods

HONORS COLLEGE

Professor Dennis B. Downey, director

Regulations governing admission, retention and graduation in the University Honors College are found in the *Special Academic Opportunities* section.

COURSE REQUIREMENTS

To graduate in the University Honors College, students must demonstrate competence in English composition and either statistics or calculus. They are required to take SSCI 203H and ENGL 241H, an honors laboratory science course, an honors perspectives course, at least nine hours of honors electives and HNRS 489/499 (Honors Thesis/creative project/research internship or departmental honors thesis equivalent). To remain in good standing in the Honors College, students must maintain a minimum GPA of at least 3.20 and a 3.35 in Honors coursework. University Honors College students who achieve a final overall GPA of 3.8 or higher will graduate from the University Honors College "With Distinction."

To receive the University Honors baccalaureate, students must:

1. Earn a cumulative GPA of at least 3.20 and a 3.35 in honors coursework.
2. Earn a minimum of 30 honors credits and fulfill the Honors College curricular requirements. Honors credit is awarded only for those honors courses in which a B- or higher is earned.
3. Maintain a GPA of 3.35 in all honors coursework.
4. Students must complete and successfully defend an honors thesis.
5. With proper approval, an Honors College student may enroll in up to two courses (maximum of 6 or 8 credits, depending on the major) in their department major and earn honors credit. Only courses at the 200 level or above will be considered appropriate. Students must have already earned a minimum of 15 credit hours with an honors designation.

SELECTED COURSE DESCRIPTIONS

The Honors College and the academic departments cosponsor courses in a variety of disciplines on a regular basis. See class schedules each semester and listings in departments for additional honors courses. Honors courses are open to Honors College students, students with a 3.35 GPA and students with permission of instructor.

BIOL 108H: 1 s.h.

Honors Freshman Biology Seminar

Emphasis on the intellectual and historical context of the core ideas of BIOL 100 and in-depth exploration of ideas raised in lecture and laboratory. Satisfies the honors lab when taken with BIOL 100. Offered fall, spring. Prereq or coreq: BIOL 100.

BIOL 212H: 1 s.h.

Honors Zoology Seminar

Continuation of BIOL 211. Original investigations and/or readings and discussions of the zoological literature about the diverse adaptations of animals to their environments. Completion of both BIOL/HNRS 212 and BIOL 211 earns 5 credits to be counted as one course in the G2 block. BIOL/HNRS 212 may not be used independently to fulfill a G2 requirement. Offered periodically. Prereq: completion of BIOL 211 with a grade of B- or higher and member of University Honors College or 3.35 GPA or instructor's permission.

BIOL 222H: 1 s.h.

Problem Solving in Botany

An opportunity to define a problem with a botanical basis, search appropriate literature, formulate a hypothesis and collect appropriate information to test the hypothesis through experimentation and data gathering. Completion of both BIOL/HNRS 222 and BIOL 221 earns 5 credits to be counted as one course in the G2 block. BIOL/HNRS 222 may not be used independently to fulfill a G2 requirement. Offered periodically. Prereq: BIOL 221 with a grade of B- or higher and member of University Honors College or 3.35 GPA or instructor's permission.

BIOL 266H: 1 s.h.

Advanced Principles of Cell Biology

Cellular operations and processes (hormonal control of cell physiology, secretory activities and vesicular trafficking, control of cell division, neurotransmission, control of muscle contraction, signal transduction, interrupted genes, cell recognition, etc.). Students explore and lead discussions on one of these topics. Completion of both BIOL/HNRS 266 and BIOL 263 earns 5 credits to be counted as one course in the G2 block. BIOL/HNRS 266 may not be used independently to fulfill a G2 requirement. Offered periodically. Prereq: completion of BIOL 263 with a grade of B- or higher and member of University Honors College or 3.35 GPA or instructor's permission.

CHEM 113H: 1 s.h.

Honors Seminar for Introductory Chemistry

The ideas of introductory chemistry are studied in extended depth, using problems, laboratory exercises, readings and discussion. Grades of B- or better in both CHEM 112 and CHEM 113 will result in honors designation for the pair. The pair of courses count as one entry in the science component of general education and result in 5 hours of general education credit. 1 hr. discussion. Prereq or coreq: CHEM 112 is required.

CHEM 372H: 3 s.h.

The History of Chemistry and Society

The history of the development of the science of chemistry from its roots in Egyptian and Greek societies through its specialization in the early 20th century. The relationships between chemical developments and society are explored, as well as the influences of chemistry on Western thought. 3 hrs. of discussion. Offered spring. Prereq: CHEM 102, 104 or 111; two social science courses, including one history course: HIST 100, 101 or 310 preferred.

COMM 100H: 3 s.h.**Fundamentals of Speech**

Required fundamentals course in general education. An introductory study of the principles of public speaking, with particular emphasis upon the selection and organization of information for persuasive purposes. Satisfies competency requirement. Offered fall, spring.

ENGL 110H: 3 s.h.**Honors English Composition**

Emphasis on development of research and analytical skills; presumes basic writing ability. Students who demonstrate competency in English 110 are exempt from this requirement. Offered fall, spring.

ENGL 241H: 3 s.h.**Explorations in World Literature**

Investigation of connections among a selection of representative literary works from at least three different linguistic traditions and various historical periods in both Western and non-Western cultures. Prereq or coreq: ENGL 110.

MATH 163H: 5 s.h.**Honors Calculus I (G2)**

Concepts of calculus intended primarily for students majoring in mathematics and the sciences. The notions of limit, derivative, definite and indefinite integral are developed in detail, as well as the underlying philosophy of the mathematics and use of calculus in a modern computational environment. Offered fall. Prereq: permission of instructor; math placement exam.

MATH 301H: 3 s.h.**History of Mathematics (P)**

The progression of mathematical concepts in the context of the thought and civilization of the time, from the Babylonians to the 20th century. Focus on the contributions of the Hellenic and Alexandrian Greeks as a point of departure for the evolution of geometry, number theory, analysis and logic. Proofs of some of the great theorems. Offered fall, spring and periodically in summer. Prereq: COMM 100, ENGL 110, MATH 151 or 156 or 161 or 163, junior status.

PHYS 230H: 1 s.h.**General Physics Seminar (G2)**

The ideas of introductory physics in extended depth in the language of calculus, using problems, laboratory exercises, readings and discussion. Grades of B- or higher in both PHYS 231 and PHYS 230H will result in honors designation for the pair. The pair of courses count as one entry in the science component of the curriculum record form and result in six hours of general education credit. Offered fall, spring. Coreq: concurrent registration in PHYS 231 required and either good standing in the Honors College or a 3.35 GPA or permission of instructor.

PSYC 318H: 3 s.h.**The Psychology of Racism (P)**

Examination of individual and institutional racism in all its aspects, with an emphasis on the various psychological explanatory theories and supporting research, as well as the various techniques for alleviating this problem. Additional overview of resultant effects on the victims. Offered periodically. Prereq: COMM 100, ENGL 110, PSYC 100 and junior status.

SSCI 203H: 3 s.h.**Explorations in the History of Ideas**

Topics in intellectual history, with an emphasis on the development of the "West" and its interactions with other civilizations and cultures. Offered fall. Prereq or coreq: ENGL 110.

HUMANITIES

College of Arts, Humanities and Social Sciences

HUMN 380: 3 s.h.**Latino Issues of Identity (P)**

Critically examines a variety of poetry, fiction, short stories and essays produced by U.S. Latino/a writers and artists. Analysis of films and newspaper clippings related to the Latino experience will be discussed. Texts examined will be approached not as isolated words on a page, but as part of a living culture with a rich historical context. Interdisciplinary in nature, combining literature with history and cultural studies, but also comparative, since the diversity of cultures will be explored under the rubric of "Latino," which includes Chicanos, Puerto Ricans, Cubans and Dominicans, among others. Knowledge of Spanish not necessary. Offered infrequently. Prereq: COMM 100, ENGL 110 and junior status.

HUMN 391: 3 s.h.**Topics in the Humanities (G1, W)**

In-depth investigation and development of a topic of current interest not covered in regularly scheduled courses. The topics will vary according to the needs and interests of the students and the faculty involved. Specific topics will be identified by the subtitles each time the course is offered. Course may be taken for credit each time the content (subtitle) is different. Offered periodically. Prereq: ENGL 110.

HUMN 401: 3 s.h.**Humanities**

An interdisciplinary course offered intermittently by any two or more departments in the Humanities Division (e.g., English and philosophy, art and music, etc.). The course offers the student an opportunity to pursue related themes or cultural movements, as they are manifested in more than one field of study. Offered infrequently.

INTERNATIONAL STUDIES

Professor R. Bookmiller, director

Millersville University offers a major and minor in international studies. Many faculty from various disciplines teach in the program.

International studies offers students a valuable perspective and useful skills for careers in government, international relations, foreign service, law, business, teaching, journalism, communications or for proceeding to higher degrees. For students working toward other degrees, including degrees in the sciences, mathematics or the technical disciplines, a minor or a second major in international studies will provide a global frame of reference and preparation for future work with international colleagues.

International studies prepares students for success in a world made smaller by the steady increase of international contact in society, politics and business. The international studies major and minor emphasize comparative social, cultural, economic, environmental, historical and political systems worldwide. Comparative studies of music, literature, religion and education also are offered. Through these studies, students acquire knowledge and tools that enable them to analyze and understand the complex world in which we live.

COURSE REQUIREMENTS

International Studies Minor: 18 s.h.

Required courses: INTL 201 and INTL 488.

International Studies Electives (12 s.h.): Students choose two from the following four areas and take two courses from each area. These courses cannot count toward the student's major.

Comparative Societies
Economic Interdependence
Global Environmental Issues
International Relations

NOTE: Consult the curriculum sheet or DARS (degree audit) for course listings and distribution requirements.

Students minoring in international studies are strongly encouraged to study abroad and to study a foreign language.

COURSE DESCRIPTIONS

INTL 201: 3 s.h. (G3)

Introduction to International Studies

Study of global cultural diversity, economic interdependence, environmental issues and international relations. Offered fall, spring.

INTL 488: 3 s.h.

Senior Seminar

Research, discussion and analysis of current global issues. Offered fall, spring.

INTL 491: 1-6 s.h.

Topics in International Studies

Investigation of topics on economic, environmental or political global systems or in-depth comparative study of international issues, cultures or the arts. Offered annually.

INTL 498: 1-6 s.h.

Independent Study

For further information, see the *Special Academic Opportunities* section.

Descriptions of other courses approved for international studies may be found under the appropriate departmental listing of courses.

LATINA(O) STUDIES

Professor Kimberly Mahaffy, director

Latino studies is an 18-credit interdisciplinary minor that consists of courses from a wide variety of academic disciplines, including anthropology, sociology, education, geography, history, humanities, mathematics, music, philosophy and Spanish, as well as an introductory and senior-level course in Latino studies. The Latino studies minor will allow students to become conversant with the language, roots, culture, history and socioeconomic perspectives of the rapidly growing Latino population in the United States. Because the program is both multicultural and multidisciplinary, it promotes the holistic liberal arts approach to learning. Courses in the minor will emphasize Latino perspectives, the development of critical thinking as well as written and oral communication skills within this field of study and across other disciplines.

Students are required to take two core courses: LATS 201: Introduction to Latino Studies; and LATS 488: Senior Seminar, LATS 300/400 Internship or LATS 498 Independent Study. The minor also requires nine credits (three courses) from a group of courses dealing with race, culture and ethnicity, and one additional elective from a list of approved courses. This program will be particularly effective when combined with majors that offer an organic relationship to Latino issues (such as business administration, government and political affairs, history, sociology, social work or education, to name a few). Successful completion of the Latino studies minor will enable graduates to become effective employees as they take their place in an increasingly diverse workplace.

Latino Studies Minor: 18 s.h.

Required courses: LATS 201 and LATS 488, LATS 300/400 or LATS 498, plus three courses from two different groups chosen from the list of race, culture and ethnicity courses, and one course from the approved list of LATS elective courses. Students are encouraged to carefully plan their Latino studies curriculum and then discuss their plans with their minor and major advisors.

COURSE DESCRIPTIONS**LATS 201: 3 s.h.****Introduction to Latino Studies (D, G1)**

An introductory course designed to study the history, politics, economics and culture of the major Latino groups in the United States: Mexicans, Puerto Ricans, Cubans, Dominicans and Central Americans. Offered fall.

LATS 300/400: 3-6 s.h.**Internship**

Allows students to volunteer or work at a Latino/a serving organization.

LATS 488: 3 s.h.**Latino Studies Senior Seminar**

Upper-level interdisciplinary study of Latino cultures through readings, independent student research and service-learning experiences. Prerequisites: LATS 201 and two additional courses that count toward the Latino/a studies minor. Offered periodically.

LATS 491: 3 s.h.**Topics in Latino Studies**

Investigation of topics related to the cultures, contributions and experiences of Latinos living in the United States. Offered periodically. Prereq or coreq: LATS 201.

LATS 498: 1-6 s.h.**Independent Study**

Allows students to pursue an academic area of interest not available through an established course under the guidance and supervision of a faculty member. For further information, see the *Special Academic Opportunities* section of the catalog, and consult with the director of Latino studies or your advisor.

APPROVED LATINO STUDIES COURSES

Descriptions of these courses may be found under the appropriate departmental heading.

CORE COURSES (6 credits)

- LATS 201: Introduction to Latino Studies**
- LATS 300: Internship**
- LATS 488: Latino Studies Senior Seminar**
- LATS 498: Independent Study**

Race, Culture and Ethnicity (9 credits) (choose 3 credits from at least two different groups)**Group 1**

- ANTH 226: Comparative Societies (Latino Cultures)**
- ANTH 227: Culture through Film (Latino)**
- ANTH 344: Gender, Race and Class**
- GEOG 343: Latin America**
- HIST 284: Modern Latin America**
- HIST 380: U.S.-Latin American Relations**
- SOCY 216: Human Population**
- SOCY 308: Sociology of African-American Latino Education**

Group 2

- HUMN 380: Latino Issues of Identity**
- SPAN 201: Intermediate Spanish I**
- SPAN 202: Intermediate Spanish II**
- SPAN 313: Survey of Spanish-American Literature**
- SPAN 361: Oral Spanish I**

Group 3

- EDUC 403: Cultural Diversity: Pluralism in the Classroom**

Latino Electives (choose one)

- ECON 203: Introduction to World Economics**
- ECON 226: Area Studies (with approval of LATS)**
- EDUC 433: Gender and Race Issues in Children's Literature**
- HIST 283: Colonial Latin America**

INTL 491: Topics in International Studies (with approval of LATS)
LATS 491: Topics in Latino Studies
MATH 102: Survey of Mathematical Ideas in Non-European Culture
PHIL 407: Political and Social Philosophy
PSYC 318: The Psychology of Racism
SPAN 314: Survey of Spanish-American Literature II
SPAN 333: Spanish-American Civilization I
SPAN 334: Spanish-American Civilization II

MANAGEMENT

See Business Administration

MARINE BIOLOGY

See Biology

MARKETING

See Business Administration

MATHEMATICS

College of Science and Technology

Professor Schultz, chairperson
 Professor White, assistant chairperson
 Professors Buchanan, Catepillan, Fenwick, Shao, Shoemaker, Umble, Zhan
 Associate Professors Blum, Cardwell, Han, Heitmann, Ikenaga, Moss
 Assistant Professors Ma, Robinson, Taylor, Washington, Wismer
 Instructor Brislin, Garber

The Department of Mathematics offers three baccalaureate-degree programs with a major in mathematics. It also offers minors in mathematics and statistics.

The recommended course sequences in the three mathematics programs are virtually identical through the first two years. The B.A. degree program in mathematics is a flexible curriculum designed to accommodate the widest possible range of career objectives. It is structured according to the traditional liberal arts approach to college education. The second semester of a foreign language is required in the B.A. program. The B.S. degree program is more specifically applications oriented. With more required courses in mathematical analysis and science, it is somewhat less flexible than the B.A. program. The B.S.Ed. degree program is the degree and certification degree program for prospective secondary teachers of mathematics. In addition to having mathematics course requirements comparable to those of the two other programs, the B.S.Ed. requires appropriate educational methods courses.

Mathematics majors may elect an option in actuarial science, applied mathematics or statistics designed to prepare students for careers in these allied fields.

For admission as a major in mathematics, a student is expected to have a sound preparation in high school academic mathematics: algebra I and II, plane geometry and precalculus (trigonometry and analytic geometry). Such students normally begin their mathematics sequence with Calculus I. Students who have completed a calculus course in high school are encouraged to take the College Board Advanced Placement Exam and have their score sent to Millersville University for evaluation. University credit for freshman-level mathematics courses may be offered to students with scores of 3 or higher. For further information, see *Advanced Placement Examinations* in the *Admissions* section.

In an effort to ensure that each student is properly placed, the department administers mathematics placement tests to all new students during the spring and early summer. For more information, see the *Curriculum* section.

The cooperative education program allows students valuable experience in a full-time or part-time professional position related to their career goals, adding practical relevance to their program of study as well as significant financial remuneration. This often leads to full-time employment after graduation. Students may elect one or more cooperative education experiences.

Retention in the Major Policy

University requirements for retention must be met. A mathematics major taking any course required as a prerequisite for a later mathematics course must earn a grade of C- or higher in that course before taking the later course for which it is a prerequisite.

COURSE REQUIREMENTS

Mathematics Major (B.A.): 120 s.h.

A. Mathematics Courses Required: 43-44 s.h.

1. Required core courses: MATH 161 or 163, 211, 310, 311, 322, 345, 464.
2. Six of the following: MATH 335, 353, 355, 365, 370, 375, 393, 395, 422, 435, 445, 457, 465, 467, 471, 472, 483, 4X8, 535, 536, 566, 592. Selected 500-level courses may be substituted with departmental permission. These six courses must include either MATH 335 or 365, and at least one of MATH 422, 435, 445, 465 or 467. Other courses may be substituted by departmental permission.

B. Required Related Courses 13-20 s.h.

1. CSCI 161.
2. The second semester of a foreign language.
3. One of the following options:
 - a. two courses (at least 3 credits each) chosen from the biology, chemistry, computer science, earth sciences and physics departments, which count toward a major in that department; PHIL 312 may be substituted for one of the two courses or,
 - b. three courses (at least 3 credits each) from a single department, chosen from courses counting toward the major in that department.

Mathematics Major (B.S.): 120 s.h.**A. Mathematics Courses Required: 43-44 s.h.**

1. Required core courses: MATH 161 or 163, 211, 310, 311, 322, 335, 345, 365, 375, 464.
2. Any three of the following: MATH 353, 355, 370, 393, 395, 422, 435, 445, 457, 465, 467, 471, 472, 483, 4X8, 535, 536, 566, 592. Selected 500-level courses may be substituted with departmental permission. These three courses must include at least one of MATH 422, 435, 445, 465 or 467; others may be substituted by departmental permission.

B. Required Related Courses: 18-22 s.h.

1. CSCI 161
2. PHYS 231
3. One of the following options:
 - a. three courses (at least 3 credits each) chosen from the biology, chemistry, computer science, earth sciences and physics departments, which count toward a major in that department, and to include at least one of BIOL 375, CSCI 162, ESCI 340, 341, 342 or PHYS 232 or;
 - b. four courses (at least 3 credits each) chosen from a single department, which count toward a major in that department.

Mathematics Major (B.S.Ed.): 120 s.h.**Secondary Education Certification****A. Mathematics Courses Required: 46-49 s.h.**

1. Required core courses: MATH 161 or 163, 211, 301, 310, 311, 322, 333 (or 335/435), 345, 353 or 355, 464, 405.
2. At least two additional math courses chosen from MATH 353, 355, 365, 370, 375, 393, 395, 422, 435, 445, 457, 465, 467, 471, 472, 483, 4X8, 535, 536, 566, 592. Selected 500-level courses may be substituted with departmental permission.

Refer to *Admission to Advanced Professional Studies and Certification (Education Majors)* in this catalog for more information.

B. Required Related Courses: 8 s.h.

1. CSCI 140.
2. CSCI 161

Actuarial Science Option

A student fulfills this option by including the following required courses as part of his/her B.A., B.S. or B.S.Ed. mathematics program: MATH 319, 335, 375, 435, 535; ECON 101, 102. In addition, the following courses are recommended: MATH 422, 536; BUAD 161, 162.

Applied Mathematics Option

A student fulfills this option by including the following required courses as part of his/her B.S. mathematics program: MATH 467; two of MATH 370, 471, 472 or 478; and one of PHYS 232, ESCI 341 or 342. In addition, the following courses are recommended: CSCI 406 (FORTRAN), PHYS 311, 312.

Statistics Option

A student fulfills this option by including the following required courses as part of his/her B.A., B.S. or B.S.Ed. mathematics program: MATH 335, 435, 535, 536, 537. In addition, the following courses are recommended: MATH 370, 375, 422.

Mathematics Minor 22-23 s.h.

- A. Required mathematics courses: MATH 161 or 163, 211, 311, 322.
- B. Mathematics electives: Any two mathematics courses (at least 3 credits each) chosen from courses numbered 330 or above, or MATH 310.

Statistics Minor 23-26 s.h.

- A. Required mathematics courses: MATH 161 or 163, 211, 311.
- B. Core statistics courses: Either MATH 335 and 435 or MATH 333.
- C. Applied statistics courses: MATH 535, 536 (or 438), 537.

COURSE DESCRIPTIONS**MATH 090: 3 s.h.****Basic Mathematics**

For students who need additional preparation before taking a college mathematics course. Remedial in nature and not applicable toward the science/math requirement. After successfully completing MATH 090, students are prepared to take courses that fulfill this requirement. Students who must take MATH 090 earn course credits, and the grade is counted in the cumulative grade point average, but MATH 090 course credit cannot be counted towards fulfillment of the baccalaureate or associate degree.

MATH 100: 3 s.h.**Survey of Mathematical Ideas (G2)**

A liberal arts course for students who will not be scheduling a technical/professional math course. A survey of mathematics important to the history of Western civilization and to the modern world. Introductory modules covered usually include number theory, geometry, topology, probability, statistics, graph theory, consumer mathematics and set theory. No credit in math/science block for math and science majors. Prereq: MATH 090 with a grade of C- or higher or math placement testing/evaluation before registration. MATH 100 and MATH 102 may not both be taken for general education credit.

MATH 101: 3 s.h.**College Algebra**

For students who need to improve their algebraic skills before taking a higher-level course such as MATH 151, 160 or 161; focuses on algebraic topics needed for success in college mathematics and its applications. Includes the real number system, linear equations and inequalities, word problems, polynomials and factoring, rational algebraic expressions, exponents and radicals, quadratic equations, irrational equations, graphs of equations, systems of equations, and logarithmic and exponential functions. Prereq: high school algebra I, II and geometry; math placement testing/evaluation before registration; C- or higher in MATH 090.

MATH 102: 3 s.h.**Survey of Mathematical Ideas in Non-European Cultures (D, G2)**

A survey of mathematical ideas developed by non-European cultures, including, but not limited to, those of Africans, Asians and native North, Central and South Americans. Includes culture and specific examples from the following areas of mathematics: number theory, topology, probability, group theory and logic. No credit under block G2 for math or science majors. Prereq: MATH 090 with a grade of C- or higher, math placement testing/evaluation before registration. MATH 100 and MATH 102 may not both be taken for general education credit.

MATH 104: 3 s.h.**Fundamentals of Math I (G2)**

Mathematics content that elementary and special education teachers of mathematics at any level need to know and understand before beginning to teach. Designed to equip all such majors with sufficient knowledge and facility in mathematics for teaching it effectively. Includes sets and logic, number systems, structure of algorithms, number theory, properties of integers, rational numbers and real numbers, and beginning geometry and measurement. Emphasis on problem solving and reasoning within each topic. Required of all early childhood education and middle-level majors. Prereq: math placement testing/evaluation before registration.

MATH 105: 3 s.h.**Fundamentals of Math II (G2)**

An extension of MATH 104; covers additional mathematics topics relevant to teaching elementary mathematics. Includes algebra, additional study in geometry and measurement, probability and statistics, graphing and further emphasis on problem solving and reasoning. Required of all early childhood education majors. Prereq: C or higher in MATH 104 and passing score on the basic skills test.

MATH 110: 2 s.h.**Trigonometry**

For students preparing to take calculus who need additional background in trigonometry. Beginning with angles, numerical trigonometry and triangle solving, it develops the concepts and analytical skills required in calculus: identities, inverse functions, trigonometric equations, graphs and applications. Prereq: MATH 101 or math placement testing/evaluation before registration, and high school algebra I, II and geometry.

MATH 130: 3 s.h.**Elements of Statistics I (G2)**

Derivation of basic formulas; measures of central tendency and variability; probability and normal curve; sampling and hypothesis testing; confidence intervals. No credit toward a math or four-year computer science major, or under block G2 for majors in the College of Sciences and Technology except for nursing majors and allied health technology majors. Prereq: any 100-level MATH course or math placement testing/evaluation before registration. Credit will not be granted for both MATH 130 and MATH 235.

MATH 151: 4 s.h.**Calculus for the Management, Life and Social Sciences (G2)**

Elementary calculus and its applications in business, economics, life and social sciences. Functions, limits and continuity. The derivative, applications in marginal analysis, optimization, differentials and error estimation. Antiderivatives, area under a curve and definite integrals; integration by parts. Exponential and logarithmic functions; applications to growth and decay problems; improper integrals. No credit toward a major or minor in mathematics. Prereq: MATH 101 or equivalent with a grade of C- or higher, or math placement testing/evaluation before registration. Credit will not be granted for both MATH 151 and MATH 161.

MATH 160: 4 s.h.**Precalculus (G2)**

For students preparing to take Calculus I (MATH 161) who need additional background. Covers topics in which beginning calculus students are often deficient: elementary functions, curve sketching, theory of equations, inequalities, trigonometry and analytic geometry. No credit toward a math major. Prereq: two years of high school algebra, one year of high school geometry and trigonometry, and math placement testing/evaluation before registration; or C- or higher in MATH 101.

MATH 161: 4 s.h.**Calculus I (G2)**

Introduces concepts and techniques of calculus, beginning with limits. Major emphasis is on the theory and applications of limits, continuity, derivatives, antiderivatives and the definite integral. Includes introductory calculus of trigonometric, inverse trigonometric, exponential and logarithmic functions. Prereq: C- or higher in MATH 160 or math placement testing/evaluation before registration. Credit will not be granted for both MATH 151 and MATH 161.

MATH 163/163H: 5 s.h.
Honors Calculus I (G2)

Concepts of calculus intended primarily for students majoring in mathematics and the sciences. The notions of limit, derivative, and definite and indefinite integral are developed in detail as well as underlying philosophy of mathematics and use of calculus in a modern computational environment. Offered fall. Prereq: permission of instructor.

MATH 204: 3 s.h.

Algebraic Foundations for the Middle-Level Teacher

Designed for middle-level (4-8) teacher candidates. It contains a concrete study of algebraic structures encountered in the middle-level school mathematics curriculum. Content includes sequential patterns and examples and properties of rings and integral domains such as the integers, integers mod n , polynomials and matrices. Prereq: passing score on the basic skills test and grade of C or better in MATH 104 or department permission. For middle-level education majors only.

MATH 205: 3 s.h.

Geometry for the Middle-Level Teacher

Designed to equip middle-level (4-8) teacher candidates with sufficient knowledge and mathematical experiences for teaching geometry and measurement effectively. Includes the study of two-dimensional and three-dimensional figures, geometric constructions, congruence, similarity, angle measure, distance, area and volume. Connections between geometry and other mathematics topics, nature and art are addressed. Prereq: passing score on the basic skills test, and C or better in MATH 104 or department permission. For middle-level education majors only.

MATH 211: 4 s.h.

Calculus II (G2)

Continuation of MATH 161. Techniques of integration, applications of the definite integral, improper integrals, parametric equations, polar coordinates, sequences and infinite series. Prereq: C- or higher in MATH 161 or 163.

MATH 230: 3 s.h.

Data Analysis and Probability for the Middle-Level Teacher

Designed for middle-level (4-8) teaching candidates as an introduction to probability and statistics. Course will cover the following topics at an appropriate level: descriptive statistics, counting and basic probability, concept of random sampling, random variables and probability distributions, and statistical inference involving confidence intervals and hypothesis testing. Prereq: passing score on the basic skills test, and C or better in MATH 104 or department permission. For middle-level education majors only.

MATH 235: 3 s.h.

Survey of Statistics (G2)

A survey of elementary probability theory, estimation, hypothesis testing, and simple regression and correlation. Interpretation of statistical inference in the analysis of data. Emphasis on applications in both behavioral and physical sciences. Prereq: MATH 101 or MATH 151 or higher, or math placement of MATH 151 or higher. Credit will not be granted for both MATH 130 and MATH 235.

MATH 236: 3 s.h.

Elements of Statistics II (G2)

An extension of MATH 130 or MATH 235. Includes estimation, hypothesis testing, design of experiments with analysis of variance, regression analysis, covariance analysis and nonparametric approaches. Includes experiences using a variety of computing devices. A substantial methods course for any major who needs to use statistical techniques. No credit toward math major. Offered spring. Prereq: MATH 130 or MATH 235.

MATH 301/301H: 3 s.h.

History of Mathematics (P)

The progression of mathematical concepts in the context of the thought and civilization of the time, from the Babylonians to the 20th century. Focus on the contributions of the Hellenic and Alexandrian Greeks as a point of departure for the evolution of geometry, number theory, analysis and logic. Proofs of some of the great theorems. Prereq: COMM 100, ENGL 110, MATH 161 or 163, and junior status.

MATH 310: 3 s.h.

Introduction to Mathematical Proof (W)

Emphasizes mathematical reasoning and communication of mathematical ideas both orally and in writing. Symbolic logic. Techniques of mathematical proof. Algebra of sets, binary relations and functions. Infinite sets, both countable and uncountable. Prereq: ENGL 110 and C- or higher in MATH 211.

MATH 311: 4 s.h.

Calculus III (G2)

Continuation of MATH 211. Vector calculus, functions of several real variables, partial differentiation, implicit functions, multiple integrals, line and surface integrals and applications. Prereq: C- or higher in MATH 211.

MATH 312: 1 s.h.

Software for Multivariable Calculus

This course will introduce students to a computer algebra system and programming language of use in understanding multivariable calculus. Assuming no prior experience with this software, the students will learn how to evaluate algebraic expressions, plot functions and perform many operations common in calculus, such as integration and differentiation. Students will develop skills with this software that are useful for the visualization and manipulation of multivariable and vector-valued functions. Offered infrequently. Coreq: MATH 311.

MATH 319: 1 s.h.

Calculus and Actuarial Science Problem-Solving Seminar

An extension and synthesis of the calculus sequence that provides students with the problem-solving skills emphasized in such examinations as the Society of Actuaries Exam P. Does not count as an upper-division elective for the mathematics major or minor. Offered spring. Prereq: C- or higher in MATH 311.

MATH 322: 4 s.h.**Linear Algebra I (G2)**

A rigorous introduction to linear algebra. Includes systems of linear equations, matrix algebra, determinants, vector spaces, inner product spaces, geometry in \mathbb{R}^n , linear transformations, orthogonal transformations, eigentheory and diagonalization. Prereq or coreq: C- or higher in MATH 311; MATH 310 recommended.

MATH 333: 4 s.h.**Introduction to Probability and Statistics**

Designed for mathematics education majors. A rigorous study of probability, distribution theory and the basics of statistical inference. Includes probability, expectation, discrete and continuous distributions, descriptive statistics and both estimation and hypothesis testing for one- and two-sample problems. Credit will not be granted for both MATH 333 and MATH 335. Prereq: C- or higher in MATH 311.

MATH 335: 3 s.h.**Mathematical Statistics I**

Probability, random variables and probability distributions, mathematical expectation, special probability distributions and probability densities. MATH 335 may be considered as an introductory course in probability theory. Offered fall. Credit will not be granted for both MATH 333 and MATH 335. Prereq: C- or higher in MATH 311.

MATH 345: 3 s.h.**Abstract Algebra I**

Groups, rings, fields, integral domains. Emphasis on structure of algebra. Prereq: C- or higher in MATH 310 and 322.

MATH 353: 3 s.h.**Survey of Geometry**

Various examples of axiom systems, axiomatic development of Neutral Geometry followed by Euclidean and Hyperbolic Geometry. Models for Euclidean and Hyperbolic Geometry. Emphasis on proving geometric theorems, both orally and in writing. Offered fall. Prereq: C- or higher in MATH 310 and 322 or permission of instructor.

MATH 355: 3 s.h.**Transformational Geometry**

The study of geometry from a transformational point of view. The group of affine transformations, with the subgroups of similarities and motions, is studied with investigation of invariant properties. Some exposure to transformations in the complex plane. Offered spring and periodically in summer. Prereq: C- or higher in MATH 310 and 322 or permission of instructor.

MATH 365: 3 s.h.**Ordinary Differential Equations**

First-order differential equations; linear first- and second-order initial-value problems; power series solutions; applications. Also includes at least one of the following topics: special functions of mathematical physics, Laplace transforms, systems of first-order equations. Offered fall, spring. Prereq: C- or higher in MATH 311.

MATH 370: 3 s.h.**Operations Research**

Principles of model building; examples from linear optimization, network analysis, dynamic programming, probabilistic decision theory, Markov chains, queuing theory, simulation and inventory models. Applications and theory will be examined. Offered periodically. Prereq: C- or higher in MATH 322 and one of MATH 235, 333 or 335 or permission of instructor.

MATH 375: 3 s.h.**Numerical Analysis**

Numerical methods for solving systems of linear equations, solving nonlinear equations, integration, interpolation, approximation and least squares curve fitting. Error theory. Prereq: C- or higher in CSCI 161, MATH 311 and 322.

MATH 393: 3 s.h.**Number Theory**

The study of the properties of integers with respect to the fundamental operations. Primary emphasis on the logical derivations of these properties. Includes induction, divisibility, congruences, theorems of Fermat and Euler, continued fractions and quadratic reciprocity. Offered periodically. Prereq: C- or higher in MATH 310.

MATH 395: 3 s.h.**Introductory Combinatorics**

Mathematical foundation for the concepts and techniques used in combinatorics. Topics include recurrence relations, finite differences, generating functions, pigeonhole principle, special sequences of integers (such as Fibonacci, Sterling and Bell sequences), principle of inclusion and exclusion, and an introduction to the theory of graphs. Applications will be indicated. Offered periodically. Prereq: C- or higher in MATH 322.

MATH 405: 5 s.h.**Teaching of Mathematics in the Secondary School**

Place and function of mathematics in secondary education; evaluation and improvement of instruction; current trends in objectives, methods and subject matter of junior and senior high school mathematics. A considerable portion of class time is devoted to teaching mathematics to secondary school students. Must be taken simultaneously with EDSE 321. Prereq: C- or higher in MATH 333 (or 335/435), 345 and MATH 353 or 355.

MATH 419: 1 s.h.**Actuarial Science Seminar**

A synthesis of calculus-based probability that will enhance the knowledge of the fundamental probability tools for quantitatively assessing risk. Students will be provided with the skills required for such examinations as the SOA Exam P and CAS Exam 1. Does not count as an upper-division elective for the mathematics major or minor. Offered spring. Coreq: MATH 435 or permission of instructor.

MATH 422: 3 s.h.**Linear Algebra II**

A continuation of MATH 322. Topics include further theory of linear transformations and their matrix representations: invariant subspaces, equivalent and similar matrices, canonical forms. The vector space $L(V, W)$. Orthogonal transformations and isometries; analysis of Euclidean motions in \mathbb{R}^3 . Least squares approximation and theory of generalized inverses. Bilinear and quadratic forms and their matrix representations; applications to conic sections in \mathbb{R}^2 and quadric surfaces in \mathbb{R}^3 . Complex vector spaces. Offered periodically. Prereq: C- or higher in MATH 322.

MATH 435: 3 s.h.**Mathematical Statistics II**

A continuation of MATH 335. Functions of random variables, sampling distributions, point estimation, interval estimation, hypotheses-testing theory and applications. Offered spring. Prereq: C- or higher in MATH 335.

MATH 445: 3 s.h.**Abstract Algebra II**

Continuation of MATH 345. Introduction to field theory, rings of polynomials, introduction to Galois theory. Offered periodically. Prereq: C- or higher in MATH 345.

MATH 457: 3 s.h.**Elementary Differential Geometry**

Frenet frames, curvature and torsion of curves in 3-space. Calculus of vector fields, geodesics and curvature of surfaces in 3-space. Surface area and volume. The Euler characteristic of a surface and the Gauss-Bonnet theorem. Rigid motions and isometries. Riemannian metrics, parallelism, non-Euclidean geometries and applications. Offered periodically. Prereq: C- or higher in MATH 310, 311, 322.

MATH 464: 3 s.h.**Real Analysis I**

Rigorous development of the concepts and methods of calculus. The real number system and its topology; theory of limits and continuity; differentiable functions and their properties; the Riemann integral. Prereq: C- or higher in MATH 311 and MATH 345 or department permission.

MATH 465: 3 s.h.**Real Analysis II**

Continuation of MATH 464. Topics chosen from the following: convergence and uniform convergence of infinite sequences and series of functions; topology of Euclidean n -space \mathbb{R}^n ; differential calculus of functions $\mathbb{R}^n \rightarrow \mathbb{R}$ and $\mathbb{R}^n \rightarrow \mathbb{R}^m$; extreme values; implicit and inverse function theorems; Riemann integration in \mathbb{R}^n ; metric spaces; function spaces; Riemann-Stieltjes integration. Offered infrequently. Prereq: C- or higher in MATH 464.

MATH 467: 3 s.h.**Partial Differential Equations**

Fourier series and the method of separation of variables; the wave equation, heat equation and Laplace's equation; d'Alembert's formula. Maximum principles, energy integrals and uniqueness. Sturm-Liouville problems and eigenfunction expansions. Offered fall. Prereq: C- or higher in MATH 365.

MATH 471: 3 s.h.**Mathematical Modeling**

Applications of mathematics to real-world problems drawn from industry, research laboratories, the physical sciences, and engineering and the scientific literature. May include parameter estimation, curve fitting, elementary probability, optimization, computer programming, and ordinary and partial differential equations. Offered periodically. Prereq: C- or higher in MATH 365.

MATH 472: 3 s.h.**Financial Mathematics**

The mathematical analysis of investment, emphasizing the time value of money, rates of return for investment cash-flow sequences, utility functions, stochastic processes, mean-variance analysis, portfolio selection, hedging strategies, the capital assets pricing model and the Black-Scholes theory of options. This course will also introduce some of the topics covered on the Course 2 and Course 3 actuarial exams administered by the Society of Actuaries. Offered periodically. Prereq: C- or higher in MATH 311.

MATH 483: 3 s.h.**Point-Set Topology**

Foundation course for extensive study in modern higher analysis, topology and related areas. Infinite set theory, metric spaces, topological spaces, separation properties, continuous mappings, homeomorphisms, convergence theory, product spaces, quotient spaces, connectedness, compactness, function spaces, applications. Offered infrequently. Prereq: C- or higher in MATH 464 or permission of instructor.

MATH 498: variable credit**Independent Study in Mathematics**

For further information on independent study, see the *Special Academic Opportunities* section.

MATH 408-478: variable credit**Mathematics Topics Courses**

Topics courses are scheduled by arrangement with the instructor; semester hours of credit and meeting times for those courses are set by agreement.

MATH 408: Topics in Mathematics

MATH 418: Topics in Mathematics Education

MATH 438: Topics in Statistics

MATH 478: Topics in Applied Mathematics

MATH 489, 499: 1-3 s.h.

Honors Courses/Thesis

For the definition of honors course/thesis and eligibility, refer to the *Special Academic Opportunities* section of this catalog.

Honors Courses

See course descriptions as listed within this department. Also see *Honors* section of this catalog. MATH/HNRS 163, MATH/HNRS 301.

GRADUATE-LEVEL COURSES

These 500-level courses are open to qualified undergraduates with permission of the department. For course descriptions, please refer to the *Graduate Catalog*.

MATH 535: 3 s.h.

Statistical Methods I

MATH 536: 3 s.h.

Statistical Methods II

MATH 537: 1 s.h.

Statistical Problem-Solving Seminar

MATH 566: 3 s.h.

Complex Variables

MATH 577 (597): 3 s.h.

Problems in Applied Mathematics

MATH 592: 3 s.h.

Graph Theory

MEDICAL LABORATORY SCIENCE

See Biology, Medical Technology

MEDICINE

See Biology and Chemistry

METEOROLOGY

See Earth Sciences and Physics

MOLECULAR BIOLOGY

See Biology

MULTIDISCIPLINARY STUDIES

College of Education and Human Services; College of Arts, Humanities and Social Sciences; College of Science and Technology
Professor Robert Bookmiller, Coordinator

The Bachelor of Arts in Multidisciplinary Studies (MDST) major provides students creative opportunities to integrate and synthesize knowledge in the liberal arts and sciences. Students may select from preapproved tracks within the major or work with the program coordinator and faculty advisors to propose a new track toward the degree. Program tracks normally combine six courses from each of two supporting disciplinary areas with a culminating capstone experience, which is an advanced course, internship, practicum or applied research seminar in which students integrate knowledge across more than one discipline, engage in professional practice or research, and/or develop applied methodology.

Students interested in MDST should look for more information at www.millersville.edu/mdst, which includes contact information for the program coordinator.

Multidisciplinary Studies (B.A.): 120 s.h.

Subject to approval by the MDST Curriculum Committee: 18 s.h. in core program 1 (min. 9 s.h. advanced coursework); 18 s.h. in core program 2 (min. 6 s.h. advanced coursework); approved capstone course (3 s.h.); all general education requirements. Students in the major will work closely with their advisors and the program coordinator to identify elective courses that complement the core programs. The goal is for each student to take at least three courses (9 s.h.) with a clearly articulated connection to the core areas.

Approved Multidisciplinary Programs**Applied Disability Studies**

Combines courses in educational foundations with courses in social sciences and prepares students to work in the rapidly expanding area of disability services, education support and advocacy organizations. Employment opportunities exist in the government, business and nonprofit sectors.

Digital Journalism

Draws on classes from the departments of Art & Design, Communication & Theatre, and English to train students in the areas of storytelling, fact-gathering, and electronic media production to position graduates competitively for opportunities in today's convergent media environment, which includes both established and emerging news outlets.

Educational Studies

Prepares students for work in the field of education, outside of public schooling. This unique program recognizes the important educational opportunities provided by social service agencies, museums, private schools, for-profit organizations, government agencies and new education start-ups.

Entertainment Technology

Draws on coursework from the Departments of Applied Engineering, Safety & Technology and Communication & Theatre. Trains students in the right balance of technology and the performing arts to work in today's media world of live concerts, television, film, web-casting and theatre.

Environmental Hazards and Emergency Management

Educates those interested in protecting and building disaster-resilient communities. Emergency management professionals are employed at each level of government, at nonprofit disaster-relief organizations, in domestic and international nongovernmental organizations, in private sector emergency-management consulting and in information technology, among others.

Sports Journalism

Teaches students to write, report and develop multimedia sport packages for print, digital and social media formats, while giving students an understanding of the role of sports journalism in contemporary society.

MUSIC

College of Arts, Humanities and Social Sciences

Professor Houlahan, chairperson

Professors Renfro, Tacka

Associate Professors Wiley, Banks, Howell

Assistant Professors Ardrey, Darmiento, Volchansky, Atticks, Holland-Garcia

Instructors Behrens, Englar, Staherski

The Department of Music offers two degree programs leading to the baccalaureate degree with a major in music.

The Bachelor of Science in Education degree (B.S.Ed.) in music education has been given accreditation by the National Association of Schools of Music and the Pennsylvania Department of Education. Completion of the degree requirements leads to certification by the Commonwealth of Pennsylvania for the recipient to teach all music: kindergarten through high school, vocal and instrumental.

The Bachelor of Arts (B.A.) in music can be obtained in either liberal arts, or with an emphasis in music business technology.

The B.A. in music consists of a liberal arts curriculum designed to provide students with a broad coverage of courses in music. The emphasis on music literature develops basic musicianship and the ability to perform the literature, as well as provides a fuller intellectual grasp of the art.

The B.A., with emphasis in music business technology, trains future professionals for the diverse field of the music business. Housed within an academically rigorous liberal arts college, the program focuses on educating musicians who are creative thinkers, technologically savvy, well spoken and well written, and aware of the dialogues central to the music business field.

The department is cognizant of the desires of many students from all segments of the University to participate in music. Accordingly, both beginning and advanced courses are available to students enrolled in any curriculum. The music department also provides the opportunity for student performance and participation in a variety of vocal and instrumental organizations. Some of these organizations are University Choir, Orchestra, Concert Band, Wind Ensemble, the Marching Band, Chorale, Glee Club, Women's Choir, as well as Chamber Orchestra, West African Drum and Dance Ensemble, Jazz Ensemble and various other ensembles. A description of these organizations is included in the student handbook.

The music department also offers a music minor.

COURSE REQUIREMENTS

Both new and transfer students interested in the music education curriculum are advised to read the *General Requirements for Admission to Degree Programs* in this catalog. Department handbooks are available on request for prospective Bachelor of Arts and music education students.

Music Education Major (B.S.Ed.): 126 s.h.

K-12 Certification

38 s.h.: MUSI 112, 131, 141, 151, 152, 153, 156, 162, 171, 212, 231 or 377, 251, 271, 312, 331, 362, 363, 372, 373, 381, 412, 481; two music electives; seven semesters (7 crs.) of major performance and 2 crs. applied musicianship courses. Professional studies courses: EDFN 130, 211, 241; EDMU 461. One required course in related area: PHYS 205. Refer to *Admission to Advanced Professional Studies and Certification (Education Majors)* in this catalog for more information.

Music Major (B.A.): 120 s.h.

39 s.h.: MUSI 112, 131, 212, 231, 312, 331, 363, 377, 381, 391, 392, 411, 412; eight semesters (16 crs.) of major performance. Required related area: ENTR 201. Students are encouraged to take multiple music elective courses and general education electives.

Music Business Technology

42 s.h.: MUSI 193, 293, 295, 391, 395, 190, 112, 212, 131, 231; six semesters (6 crs.) of major performance and be involved in commercial music ensembles, and two internships (8 crs.). 12 s.h. required related courses: ECON 101, 102, BUAD 161, 231

Music Minor: 18 s.h.

MUSI 100, 103 or 104; six semesters of applied musicianship courses (audition required); 9 s.h. of elective courses at upper-division level.

COURSE DESCRIPTIONS

MUSI 100: 3 s.h.

Music and Culture (G1)

A general study of art music, with emphasis on listening to the compositions of Western composers. The development of music, its relationship to the other arts and its cultural influences will be examined. Designed for students with a limited musical background. Offered fall, spring.

MUSI 103: 3 s.h.

The Language of Music I (G1, D)

A course designed to develop a keen sensitivity to the language of musical sounds through creating, performing, conducting music and listening with sensitive awareness. The use of a broad range of musical materials, active exploration and personal discovery will lead the student to grasp the nature of the interactions and relationships that bring meaning to music. Language of music is structured to provide the student with a means to developing greater awareness and accuracy in musical reading and hearing. Designed for students with little or no academic musical background. Offered fall, spring.

MUSI 104: 3 s.h.

The Language of Music II (G1)

Provides in-depth coverage of the fundamentals of music. Music materials include Western and non-Western music. This is a performance-based class structured to provide the student with a means to develop greater awareness and accuracy in musical reading, writing and hearing. MUSI 104 fulfills MUSI 103 requirements. Offered fall.

MUSI 108, 109, 208, 209, 308, 309, 408, 409: .5 s.h.

Private Music Instruction

(By selection of the staff.) Private lessons in piano, organ, voice, instrument or composition through the advanced level. Offered fall, spring.

MUSI 112: 3 s.h.

Solfège, Harmony and Analysis I, According to the Kodály Concept

Provides an introduction to the structures and aesthetics of common-practice harmony for music majors and minors. Review of elements of pitch and rhythm and progresses to the introduction of triadic harmony, as well as figured bass realization. This course will investigate the harmonization of melodies and harmonic progressions through a wide range of activities. Musical materials to be studied will include selected multicultural folk music and art music examples. The study of music will be done through singing, ear training, improvisation, composition, analyses and keyboard performances. Offered spring.

Note Regarding Credit for Applied Musicianship Courses for Nonmusic Majors

A block of any six applied musicianship courses (total of 3.0 credits) counts as one general education (G1) course.

MUSI 124: 0-.5 s.h.

Commercial Music Lab Band

Music literature, ensemble technique and performance practice through musical performance in commercial music lab band. Offered fall, spring.

MUSI 126: 0-.5 s.h.

Marauder Men's Glee Club

Music literature, ensemble technique and performance practice through musical performance in glee club. Offered fall, spring.

MUSI 128: 0-.5 s.h.

Marching Band Camp

The study of music literature, ensemble technique and performance practice through musical performance in marching band. Offered fall.

MUSI 129: 0-.5 s.h.

Marching Band

The study of music literature, ensemble technique and performance practice through musical performance in marching band. Offered fall.

MUSI 220: 0-.5 s.h.**Concert Band**

Music literature, ensemble technique and performance practice through musical performance in concert band. Offered fall, spring.

MUSI 224: 0-.5 s.h.**Jazz Lab Band**

Music literature, ensemble technique and performance practice through musical performance in jazz lab band. Offered fall, spring.

MUSI 226: 0-.5 s.h.**University Choir**

Music literature, ensemble technique and performance practice through musical performance in University Choir. Offered fall, spring.

MUSI 227: 0-.5 s.h.**Women's Choir**

Music literature, ensemble technique and performance practice through musical performance in Women's Choir. Offered fall, spring.

MUSI 323: 0-.5 s.h.**Chamber Orchestra**

Music literature, ensemble technique and performance practice through musical performance in chamber orchestra. Offered fall, spring.

MUSI 324: 0-.5 s.h.**Commercial Music Ensemble**

Music literature, ensemble technique and performance practice through musical performance in commercial music ensemble. Offered fall, spring.

MUSI 420: 0-.5 s.h.**Wind Ensemble**

Music literature, ensemble technique and performance practice through musical performance in wind ensemble. Offered fall, spring.

MUSI 423: 0-.5 s.h.**Orchestra**

Music literature, ensemble technique and performance practice through musical performance in orchestra. Offered fall, spring.

MUSI 424: 0-.5 s.h.**Jazz Ensemble**

Music literature, ensemble technique and performance practice through musical performance in jazz ensemble. Offered fall, spring.

MUSI 427: 0-.5 s.h.**Chorale**

Music literature, ensemble technique and performance practice through musical performance in chorale. Offered fall, spring.

MUSI 131: 2 s.h.**Class Piano I**

Practical keyboard facility through technique, sight reading, improvisation, harmonization and composition. Multicultural folk music, art songs and original piano compositions are included. Solo, duet and ensemble literature are studied and performed. This course is designed to be taken concurrently with MUSI 112. Music majors and minors only. Offered spring.

MUSI 134, 135, 234, 235, 334, 335, 434, 435: 1-2 s.h.**Major Performance (Piano)**

Includes private study and participation in master classes. MUSI 435 is repeatable (up to 9 s.h.). Music majors and minors only. Offered fall, spring.

MUSI 136, 137, 236, 237, 336, 337, 436, 437: 1-2 s.h.**Major Performance (Organ)**

Includes private study and participation in ensembles. MUSI 437 is repeatable (up to 9 s.h.). Music majors only. Offered fall, spring.

MUSI 140: 3 s.h.**The Singing Voice in Musical Theatre (G1)**

Trains students in good vocal technique in order to handle the many vocal challenges of musical theatre. Ranging from singing in different musical styles, singing while performing demanding dance routines, dealing with amplification, the switch from spoken to sung characterization, the healthcare of the voice, development of stamina to perform eight shows a week for a year or more and basic theory in order to read and learn music. Offered spring.

MUSI 141: 1 s.h.**Vocal Methods**

A basic study of the technique of singing to adequately train the voice for practical and aesthetic reasons. Development of range quality, projection, control and the fundamentals of correct breathing is pursued through the use of suitable solo and choral literature. 2 hrs. lab. Enrollment limited to music education majors or permission of instructor. Offered fall.

MUSI 144, 145, 244, 245, 344, 345, 444, 445: 1-2 s.h.**Major Performance (Voice)**

Includes private study and participation in master classes. MUSI 445 is repeatable (up to 9 s.h.). Music majors and minors only. Offered fall, spring.

Instrumental Class Instruction

The instruments of the band and orchestra. Emphasis on basic skills for performance through materials and methods suitable for school instruction. 2 hrs. lab. MUSI 151 through 253, below, are offered periodically.

MUSI 151: 1 s.h.

Strings I, Violin, Viola. Open to music majors only or permission of instructor.

MUSI 251: 1 s.h.

Strings II, Cello, String Bass. Open to music majors only. Prereq: MUSI 151 or permission of instructor.

MUSI 152: 1 s.h.

Woodwinds I. Open to music majors only or permission of instructor.

MUSI 252: 1 s.h.

Woodwinds II. Open to music majors only. Prereq: MUSI 152 or permission of instructor.

MUSI 156: 1 s.h.

Brass I. Open to music majors only or permission of instructor.

MUSI 256: 1 s.h.

Brass II. Open to music majors only. Prereq: MUSI 156 or permission of instructor.

MUSI 153: 1 s.h.

Percussion I. Open to music majors only or permission of instructor.

MUSI 253: 1 s.h.

Percussion II. Open to music majors only. Prereq: MUSI 153 or permission of instructor.

MUSI 154, 155, 254, 255, 354, 355, 454, 455: 1-2 s.h.**Major Performance (Instrument)**

Includes private study and participation in master classes. MUSI 455 is repeatable (up to 9 s.h.). Music majors and minors only. Offered fall, spring.

MUSI 162: 2 s.h.**Introduction to Art Music**

Entry-level investigation of music history for music majors and music minors. Combining elements of a historical survey approach and class discussion, this course examines the developments in musical style in the context of societal changes, changes in aesthetic theories, the development of instruments, patronage and audience expectation. The music and art of each period will be examined with reference to the circumstances of creation and the settings in which musical works were presented. Offered fall.

MUSI 171: 3 s.h.**Introduction to Music Education**

Introduction to music teaching for prospective music educators (K-12). Emphasis on peer teaching, rote song, popular song and accompanied song; folk song analysis and collection; creating instructional materials through the use of technology. Students learn basic skills in recorder and guitar. 2 hrs. lab. Offered fall. Prereq: MUSI 112 and MUSI 141.

MUSI 190: 3 s.h.**Introduction to Careers in Music**

Introduction to careers in music for prospective musicians and anyone interested in working in the music and entertainment business. Students learn basic terminology used in the field and are introduced to fundamentals of the music industry, copyright, royalties, contracts and networking as well as guest lecturers. Offered fall.

MUSI 193: 3 s.h.**Computer Applications in Music Production I**

Develop an understanding of MIDI, sequencing and digital audio through integration of in-class demonstrations, lectures, and hands-on projects and activities. Topics covered include creating, recording and editing MIDI sequences and digital audio data, and programming, arranging, composing and mixing in the MIDI environment. Music majors only. Offered fall.

MUSI 201: 3 s.h.**Music and Sound in Cinema (G1, D)**

This course focuses on the use of music and sound in cinema. It develops specialized listening skills that are different from listening to music for pleasure. It explores the aesthetics of film sound and technology that has changed over time. Finally, it investigates music in the framework of the film sound track, and the sound track in the framework of a history of film technology.

MUSI 202: 3 s.h.**American Broadway Musicals (G1, DL)**

This course will examine the history, philosophy, music-theatre and significance of the American Broadway musical. It will give the student several opportunities to observe, discuss and report on American Broadway musical productions.

MUSI 203: 3 s.h.**Understanding the Language of Music Through... [Singing] [Keyboard] [Guitar] [Song Writing] (G1, D)**

The course begins with the elements of rhythm and pitch, and progresses to the introduction of scales, intervals and tonality; notation of rhythm and meter, rudiments of harmony and the concept of musical structure and form. Sight singing and ear training are pursued concurrently with keyboard and written theory. (This is a more in-depth course than MUSI 103, and the focus will include more complex repertoire and harmonic understanding.) Musical materials will include selected multicultural folk music and art music examples. The use of a broad range of individualized musical materials, active exploration and personal discovery will lead the student to grasp the nature of the interactions and relationships that bring meaning to music.

MUSI 207: 3 s.h.**Love Songs Through the Ages (G1, D)**

Exploration of sex-positive themes in vocal music. This course addresses diversity through a discussion of sex positivity and how this idea relates to feminism and topics within the Lesbian, Gay, Bisexual, Transgender and Questioning (LGBTQ) community, and with other related topics such as marriage, monogamy, courtship rituals and the like. While this is a music course and thus provides specific information about how music achieves its expressive ends, it also provides a broad perspective on relevant human issues and how music not only reflects, but also helps to transmit and to shape human values.

MUSI 212: 3 s.h.**Solfège, Harmony and Analysis II, According to the Kodály Concept**

Provides in-depth coverage of the structures and aesthetics of medieval and Renaissance music. Reviews basic triadic progressions in keyboard style, introduces principles of voice leading, nonchord tones, using diatonic common chords. Investigates the harmonization of melodies and harmonic progressions through a wide range of activities. Musical materials will include selected multicultural folk music and art music examples. The study of medieval and Renaissance music will be done through singing, ear training, improvisation, composition, analysis and keyboard. Offered fall. Prereq: C or higher in MUSI 112.

MUSI 231: 2 s.h.**Class Piano II**

Intermediate course in practical keyboard facility accomplished through technique, sight reading, improvisation, harmonization, composition and analysis. Primary and secondary harmonies are explored in selected multicultural folk songs, art songs and original piano compositions. MUSI 231 is designed to be taken concurrently with MUSI 212. Offered fall. Prereq: C or higher in MUSI 131. Note: Music students majoring in piano take MUSI 377 instead of this course.

MUSI 263: 3 s.h.**Popular Music (G1, D)**

Musical derivatives and development of American pop, jazz and rock styles. Lecture, live and recorded musical demonstration, discussion and analysis. Offered fall, spring.

MUSI 265: 3 s.h.**Symphonic Music (G1)**

Development of symphonic music from the mid-18th century through the present. Relationships between the symphony and other musical genres. Emphasis on listening and analytical observation. Offered fall, spring. Prereq: MUSI 100.

MUSI 267: 3 s.h.**Survey of American Music (G1)**

American music from the colonization period to the present. Composers, their works, musical organizations and folk music in relation to historical developments which have shaped America's cultural heritage. Analysis of recorded musical examples is an integral part of this course. Offered fall, spring. Prereq: MUSI 100 or permission of instructor.

MUSI 271: 3 s.h.**The Art of Teaching Elementary Music, According to the Kodály Concept**

This course is designed to prepare students for teaching general music through the integration of multicultural content and practices related to the learner in an elementary school environment. Emphasis is on leading the young learner to understand musical concepts through a variety of behaviors (singing, playing instruments, moving, reading and writing, creating and listening). Also included are issues related to musical literacy development for young students. The course includes a field experience component (observation and teaching) that is intended to allow participants to apply theoretical principles in a practical setting. Offered spring. Prereq: MUSI 212, C or higher in MUSI 171 or permission of instructor.

MUSI 293: 3 s.h.**Computer Applications in Music Production II**

Recording, editing, mixing and producing music using professional digital audio software and hardware such as ProTools. Utilize tracks from real recording sessions to gain skills in those areas focusing on vocal, bass, guitar, and drum edits and mixing parameters. Required to complete numerous technical/creative projects. Music majors only. Offered spring. Prereq: MUSI 193.

MUSI 295: 3 s.h.**Studio Recording I**

Intermediate-level course in modern studio recording techniques, including signal routing, microphone selection and placement, signal processing, session setup, mixing consoles and live recording issues. Learn how to record/mix electric and acoustic guitars, bass, amps and vocals. Required to complete numerous technical/creative projects. Music majors only. Offered fall. Prereq: MUSI 293, MUSI 112.

MUSI 301: 3 s.h.**Music in Early Childhood (G1, W, D)**

Music in Early Childhood (Pre-Kindergarten and Kindergarten) examines music through the lens of the culture(s) of young children, which (though they intersect with adult cultures) are unique, different from adult experiences, and particular to them. The course highlights the musical content of children's songs as well as the music they hear, and the kinds of musical engagements that are particular to young children. The uses, functions and meanings of music for young children are emphasized. Musical materials to be studied will include selected multicultural folk music, as well as art and commercial music examples. The culture of childhood and the music in the culture of young children is one of the primary focuses of this course.

MUSI 303: 3 s.h.**Latino Music in the United States (G1, D)**

This course will use the study of Latino music in the United States. to create greater understanding of self by examining how music shapes our cultural and personal identities, to promote cross-cultural understanding by investigating the many diverse genres encompassed by Latino music, to serve as a catalyst for sharing ideas and experiences, and to develop skills in reading, writing and talking about music.

MUSI 312: 3 s.h.**Solfège, Harmony and Analysis III, According to the Kodály Concept**

This course provides in-depth coverage of the structures of seventh chords, secondary dominants and modulations, and aesthetics of common practice harmony, with particular emphasis on the Classical and Baroque periods. Reviews diatonic progressions. This course investigates the harmonization of melodies and selected harmonic progressions through a wide range of activities. Musical materials will include selected multicultural folk music and art music examples. The study of Baroque and Classical examples of music will be done through ear training, improvisation, composition, analysis and keyboard performance. Offered spring. Prereq: C or higher in MUSI 212.

MUSI 313: 3 s.h.**Seminar in Jazz Theory and Improvisation**

Basic to intermediate/advanced-level jazz theory concepts and improvisation with practical application. Information provided in this course is supplementary for students who wish to teach instrumental music and those pursuing graduate studies or professional careers in instrumental music.

MUSI 315: 1 s.h.**Music Composition**

The art of music composition through examination of the creative process, rhythmic manipulation, melodic development, counterpoint and harmonic motivation. Creative composition is an integral part of the course. May be repeated for credit. Offered periodically. Prereq: MUSI 212 or permission of instructor.

MUSI 331: 2 s.h.**Class Piano III**

This course provides in-depth experience in sight-reading technique, keyboard analysis, harmonization, improvisation, transposition, composition and score reading. 1 hr. lec., 2 hrs. lab. MUSI 331 is designed to be taken concurrently with MUSI 312. Offered spring. Prereq: C or higher in MUSI 231.

MUSI 347: 3 s.h.**The Art of Choral Techniques**

This course is for advanced music students who wish to study specific procedures for teaching vocal music in the choral ensemble. Emphasis is placed on developing music literacy and teaching fundamentals of good singing. A concept of sound aesthetic judgment regarding the vocal idiom is developed through selected listening, reading and writing assignments. Offered periodically. Prereq: MUSI 141.

MUSI 362: 3 s.h.**Music History and Literature I (W)**

Study of Western music in its cultural, historical and philosophical contexts from 500 B.C. to 1750 A.D., including its relationship to other art forms. Introduction to research in music history. Writing projects about music. Offered fall. Prereq: ENGL 110, MUSI 100 and 312.

MUSI 363: 3 s.h.**Music History and Literature II (P)**

The history, literature and aesthetics of Western art music from 1750 through the present. Knowledge of stylistic trends and representative literature will be emphasized. A research project is associated with the course. Offered spring. Prereq: COMM 100, ENGL 110 and junior status. Music majors should consult with the department for course requirements.

MUSI 368: 3 s.h.**International Music and Arts (D, W)**

Introduction to terminology and cultural areas of the world. General introduction to the study of world music, the ethnomusicological approach, and classification and symbolism of musical instruments. The process of musical innovation and acculturation in the world, and the impact of technology and the communications media on contemporary musical styles of non-European cultures. Topics include the music of South and West Africa, Ethiopia and folk music of the Arabic Near East; the classical music of Iran and Asia; and the musical cultures of North and South India. Offered spring. Prereq: COMM 100, ENGL 110 and junior status. Offered periodically.

MUSI 369: 3 s.h.**Introduction to West African Music (P, D)**

Survey course designed to provide an in-depth analysis of West African culture and history focusing on the musical traditions found in this region of the world. General introduction to the study of West African music and dance, the ethnomusicological approach, and classification and symbolism of musical instruments will be presented. Moreover, the process of musical innovation and acculturation in West Africa, and the impact of technology and the communications media on traditional and contemporary musical styles will be examined. Offered fall, spring. Prereq: COMM 110, ENGL 110 and junior status.

MUSI 372: 3 s.h.**The Art of Teaching Middle-Level Music, According to the Kodály Concept**

Study of the organization, pedagogy and practice of the middle and secondary school general classroom, including focus on multicultural and popular music, folk song study and analysis. Field experiences include teaching 6th-, 7th- and 8th-grade general music classes and observing high-school-level orchestra, band and choral rehearsals. Students review basic guitar skills throughout the semester while also reviewing their keyboard and recorder skills. 2 hrs. lec., 2 hrs. lab. Offered fall. Prereq: admission to Advanced Professional Studies, C or higher in MUSI 271 or permission of instructor.

MUSI 373: 3 s.h.**The Art of Instrumental Techniques**

Provides the prospective instrumental music instructor with the information, materials and techniques for effective teaching and efficient administration of a successful instrumental music program via seminar and field experiences. 2 hrs. lec., 2 hrs. lab. Offered spring. Prereq: admission to Advanced Professional Studies; MUSI 152, 153, 156, 171, 381 or permission of instructor.

MUSI 374: 3 s.h.**Undergraduate Seminar in Percussion Methodology and Pedagogy**

Basic methodologies and pedagogical review relevant to teaching all areas of percussion performance. The information provided in this course is mandatory for students who wish to teach percussion methods, those pursuing graduate studies or a professional career in percussion performance, and necessary for instrumental music directors at all levels.

MUSI 377: 2 s.h.**Piano Pedagogy and Instructional Materials**

Designed to equip the piano student with techniques for setting up a studio and teaching beginning-through-intermediate levels in private and class situations. The course includes a survey of current instructional methods and observation of different pedagogical approaches to piano instruction. 1 hr. lec., 2 hrs. lab. Offered fall every two years. Prereq: MUSI 331 or permission of instructor. NOTE: Music students with a major in piano take this course instead of MUSI 231.

MUSI 381: 2 s.h.**Conducting I**

Includes fundamentals of conducting, with emphasis on gesture and developing score study technique. Choral music is used throughout this course. 1 hr. lec., 2 hrs. lab. Offered spring. Prereq: MUSI 212 or permission of instructor.

MUSI 391: 3 s.h.**Music Industry**

Provides a comprehensive overview of the mainstream music industry and the for-profit world in music. Students choose the artist track or the entrepreneur track and develop business plans and goals at the beginning of the semester that are built on the goals that the student wishes to pursue. Offered every other fall. Prereq: MUSI 190.

MUSI 392: 3 s.h.**Music in the Nonprofit Sector**

Provides a comprehensive overview of the field of arts administration and the classical music business. Topics such as nonprofit administration, grants, resumés and publishing will be discussed, as well as networking and guest lecturers. Students will have the opportunity to create a hands-on class project. Offered every other fall. Prereq: MUSI 190.

MUSI 393: 3 s.h.**Electronic Music (G1)**

Introduction to recording techniques. This class focuses on learning the basics of ProTools software, critical listening and class projects using the recording studio. A basic working knowledge of music is recommended, as class projects require some basic musical composition. Offered periodically.

MUSI 394: 3 s.h.**Advanced Studio Recording Techniques**

Provides an advanced project-based overview of recording techniques used in the recording studio, film, songwriting, arranging and sound-stage recording. A strong working knowledge of music and the ability to create music are required to complete projects. Offered periodically. Prereq: MUSI 393(204) or instructor permission.

MUSI 395: 3 s.h.**Studio Recording II**

Advanced-level course in modern studio recording techniques. Learn how to record/mix synthesizers, piano, drum set, percussion and other acoustic instruments. Required to complete numerous technical/creative projects, including recording Millersville University music ensembles and taking part in every facet of the recording process, from booking studio through mastering final product. Music majors only. Offered spring. Prereq: MUSI 295.

MUSI 396: 3 s.h.**Synthesis and Sampling**

Advanced course focusing on theory/operation of hardware and virtual synthesizers and digital audio samplers. Learn how to identify and manipulate the various parameters of synthesis and sampling devices for compositions and live performances. Advanced topics in sequencing and digital editing will be addressed. Music majors only. Offered periodically. Prereq: MUSI 395.

MUSI 411: 2 s.h.**Orchestration**

Instruments of the orchestra and band, with particular emphasis upon their ranges, timbre, balance of tone and mixed tone color. Scoring of instruments in small and large ensembles. Offered spring. Prereq: MUSI 212 or permission of instructor.

MUSI 412: 3 s.h.**Solfège, Harmony and Analysis IV, According to the Kodály Concept**

This course provides coverage of the structures and aesthetics of the Romantic period and an introduction to 20th-century practices. Reviews chromatic harmony, introduces mode mixture, enharmonic spellings and modulations found in the late 19th century. Includes an introduction to melodic and metric reduction and modulus-twelve analysis. The study of Romantic and selected 20th-century examples of music will be done through singing, ear training, improvisation, composition, analysis and keyboard performance. Offered fall. Prereq: C or higher in MUSI 312.

EDMU 461: 12 s.h.**Student Teaching and Seminar**

Student teachers are assigned full-time to cooperating teachers to gain experience in the total activities of the school. One and one-half hours per week are scheduled for seminar with the University supervisor. Offered fall, spring.

MUSI 478: 1 s.h.**Seminar in String Teaching Techniques and Materials**

Individual and group performance on string instruments; care and minor repair of instruments; analysis of string methods (including Suzuki), solo literature and string orchestra music. Arranging for various ensembles is included. 2 hrs. lab per week. Offered periodically. Prereq: MUSI 151, 251 or permission of instructor.

MUSI 481: 2 s.h.**Conducting II**

An advanced course with emphasis on gesture and score study and analysis. Instrumental music is used throughout the class. 1 hr. lec., two 75-min. workshops/labs per week. Offered fall. Prereq: C or higher in MUSI 381 or permission of instructor.

MUSI 494: 3 s.h.**Perspectives on the Harlem Renaissance (P)**

Interdisciplinary perspectives on the burst of creativity in African-American literature, theatre, musical revues, painting and film known as the Harlem Renaissance. Course is team-taught by faculty from music, English and history. Offered infrequently. Prereq: COMM 100, ENGL 110 and junior status.

MUSI 495: 3 s.h.**Audio & Music for Video**

Introductory course into the world of audio & music for video, including film, television and gaming. Covers topics such as the science and psychology of sound, sound editing, creating sound effects, recording voice-overs, and music synchronizations to picture. This project-based course is open to students who are interested in learning audio production skills as they relate to various mediums. Music majors only. Offered periodically. Prereq: MUSI 391, MUSI 395.

MUSI 498: 1-3 s.h.**Independent Study**

For further information on independent study, see the *Special Academic Opportunities* section of this catalog. Offered fall, spring.

MUSI 587: 3 s.h.**Music in the Kindergarten and Preschool Classroom**

This course is designed to prepare students for teaching preK-kindergarten children. Emphasis is on leading the young learner to understand music concepts through a variety of behaviors, such as singing, moving, creating and listening. Offered periodically in summer.

NANOFABRICATION MANUFACTURING TECHNOLOGY

See Applied Engineering, Safety & Technology

NANOTECHNOLOGY

See Chemistry and Physics

NUCLEAR MEDICINE TECHNOLOGY

See Biology

NURSING

College of Science and Technology

Associate Professor Kuhns, chairperson

Professors Davis, Zimmerman

Associate Professor W. Martimer

Instructor Monn

The Department of Nursing offers an ACEN-accredited upper-division program in nursing leading to a Bachelor of Science in Nursing (B.S.N.) degree. This program is designed for registered nurses who are graduates of accredited diploma or associate degree nursing programs with a GPA of 2.0. Nursing courses may only be taken after attaining junior-level status (60-90) credits. NURS 320, Conceptual Basis of Professional Nursing Practice, is the introductory course for the nursing major and should be taken first.

The goals of the nursing program are to provide an atmosphere and opportunities that develop intellectual curiosity, critical thinking and sound reasoning and judgment; provide knowledge from the humanities, and the physical, biological, psychological and social sciences to complement nursing theory and practice; provide a theoretical and clinical foundation in nursing to prepare a professional nurse who provides rational evidence-based and humanistic healthcare within institutional and community settings; and provide a basis for graduate education in nursing.

COURSE REQUIREMENTS

Nursing Major (B.S.N.): 120 s.h.

NURS 320, 330, 340, 360, 421, 428, 438, 478, 504; 11 s.h. of biology, 3 s.h. of statistics, 3 s.h. of departmentally related courses, 30 s.h. lower-division nursing credits on admission.

School Nurse Certification (K-12)

This approved Pennsylvania Department of Education School Nurse Certification Program is a post-baccalaureate certification program. A B.S.N. and PA-registered nursing license are required. In addition, evidence of an undergraduate health assessment course, NURS 421, BIOL 256, PSYC 227/228, MATH 130, ENGL 110 and a GPA of 3.0 upon B.S.N. graduation. Applicants desiring admission should request information from the Millersville University Certification Office. SPED 601; EDFN 545; NURS 560; PRAXIS I and II and a GPA of 3.0 upon completion of certification requirements.

COURSE DESCRIPTIONS

Junior Level (60-90 credits)

NURS 315: 3 s.h.

Scientific Advances in Healthcare: An Integrated Perspective (P)

Major contemporary health trends and issues will be presented. Discussion will identify the integration of certain biological, psychosocial, educational and healthcare components as they impact on the individual/family unit. Open to all majors. Prereq: ENGL 110, COMM 100 and junior status. Does not satisfy nursing electives for B.S.N. majors.

NURS 316: 3 s.h.

Women, Health and Healthcare: Controversies and Dilemmas (P)

Examines the physical, psychosocial, economic, cultural, ethnic, racial and political factors that impact women's health. Case studies of current health dilemmas that affect women in today's society will be analyzed. Prereq: ENGL 110, COMM 100 and junior status. Does not satisfy nursing electives for B.S.N. majors.

NURS 320: 3 s.h.

Conceptual Basis of Professional Nursing Practice

Nursing, change and systems theories with application to healthcare delivery. Emphasis on decision making and the nurse as change agent. 3 hrs. lec. Nursing majors only.

NURS 330: 3 s.h.**Ethics of Healthcare Innovations**

Introduces the student to the ethical dimension of nursing practice. Focuses on moral reasoning, ethical theories, values, virtues and other principles. Examines contemporary clinical trends and issues health trends within the context of ethical care. Models of ethical decision making are explored and applied. Role of the ANA Code of Ethics within the profession is examined.

NURS 340: 3 s.h.**Environmental Factors Affecting Health Status**

Discussion of environmental health and factors that influence the holistic person's health. Emphasis on the importance of environmental health assessment and the health effect of air, water and soil pollution; environmental safety hazards and nursing responsibilities for intervention in a personal, community and political realm. Effects of pollution and safety hazards discussed from a nursing perspective. 3 hrs. lec.

NURS 350: 3 s.h.**Pathways to Healthy Aging (G2)**

In-depth study of health needs of the elderly. Health is viewed in its broadest biopsychosocial context. Review of physiologic and psychosocial changes that occur with aging and the adaptations necessary to cope with such changes. 3 hrs. lec. Offered periodically. Open to all majors.

NURS 360: 4 s.h.**Assessment and Diversity in Nursing Practice (D)**

Integration of physical assessment has positive effects on patient care delivery. An important component of health assessment of the diverse client is a contextual (cultural) review. Cultural assessment is crucial to providing cultural care, which enables providers to deliver services that are respectful of and responsive to the health beliefs, practices and cultural and linguistic needs of diverse patients. Cultural competency is critical to reducing health disparities and is responsive to the needs of diverse patients, resulting in improved patient outcomes.

Senior Level (91-120 credits)

NURS 421: 5 s.h.**Population-Based Nursing (W)**

The nurse's role in promotion of health of aggregates in the community is explored, with an emphasis on vulnerable populations. Public health concepts, using a population focus, are directed toward health promotion and levels of prevention with evidence-based care to create healthier communities and populations. Prereq: NURS 320.

NURS 428: 3 s.h.**Nursing Research (W)**

Emphasis on critique and utilization of nursing research. The fundamentals of scientific nursing research and inquiry are explored, including the identification of major elements of a research proposal. Students will identify researchable nursing problems within an area of professional practice. Prereq: ENGL 110, MATH 130. Nursing majors only.

NURS 435: 1-3 s.h.**Topics in Nursing**

In-depth investigation of topics of current interest in the nursing field. Topics to be announced when course is offered. Offered periodically.

NURS 438: 3 s.h.**Health Policy and Nursing Issues**

Discussion of the political, economic, legal, ethical and related societal issues which influence nursing practice and education. Professional nursing roles and responsibilities are emphasized. 3 hrs. lec. Nursing majors only.

NURS 478: 4 s.h.**Transforming Healthcare Through Leadership in Nursing (W)**

This senior-level capstone course builds and expands upon work completed to date in the B.S.N. program and is designed to prepare students for leadership roles. Concepts of leadership and management will be described and ultimately applied to seminar topics and clinical experiences. Emphasis is also placed on the interdependence between the nursing profession and various levels of issues as they pertain to real-life world events. Seminar topics include fiscal management, case management and public-policy issues, among others. Clinical experiences will allow the student to practice with a nurse leader in the community. Prereq: ENGL 110, NURS 320, 428.

NURS 498: 1-3 s.h.**Independent Study in Nursing**

An individualized experience based on the student's particular interests. Provides an opportunity to demonstrate creativity and initiative to further investigate an area of interest in practice, research or education in nursing. Offered periodically. Prereq: NURS 428.

NURS 504: 3 s.h.**Technology, Informatics and Professional Nursing Practice**

Discussion of the ways in which information and technology influence practice and decision making in various aspects of nursing practice, such as clinical, education, leadership and research, is the major focus of the course. Advances in technology that support and enhance the delivery of care and interdisciplinary communication are addressed. The legal, ethical, cultural, economic and social factors affecting healthcare information technology are also explored.

OCCUPATIONAL SAFETY & ENVIRONMENTAL HEALTH

See Applied Engineering, Safety & Technology

OCEAN SCIENCES & COASTAL STUDIES

See Earth Sciences

PHILOSOPHY

College of Arts, Humanities and Social Sciences

Associate Professor Ward, chairperson
Assistant Professors Kaiser Ortiz, Miller

Philosophy courses are open to all students and present an opportunity for students to develop their critical-thinking skills on a broad range of issues. Traditional subjects include philosophy of religion, introduction to logic and ethical theories. Nontraditional courses include Philosophies of Death and Dying, and Philosophy in Film.

A major in philosophy is designed to acquaint students with a wide range of philosophers, philosophic concepts and philosophic problems. Such a major can provide adequate training for those who wish to attend graduate school in philosophy, or it can be used as a preprofessional or pretheological degree. In order to supplement knowledge obtained in another major, some students choose philosophy as a second major or as a minor.

COURSE REQUIREMENTS

Philosophy Major (B.A.): 120 s.h.

PHIL 321, 322, 328, 471, either 211 or 312, plus at least 6 s.h. of courses numbered 300 or above to make up the required 30 s.h. Competency in a foreign language through the elementary level, two semesters or equivalent. (Does not apply to double majors.)

Philosophy-Psychology Double Major (B.A.): 120 s.h.

Philosophy requirements: 30 credits of philosophy as listed under the philosophy major. PSYC 454 may be credited as an elective in philosophy.

Psychology requirements: 33 credits of psychology and the required related courses as listed above for the major. One course from PHIL, including PHIL 201, PHIL 202, PHIL 211 or PHIL 401, may be credited as a psychology general elective, as long as it is not used as the required related philosophy course.

Philosophy Minor

PHIL 321, 322, either 211 or 312, either 328 or 471, and two philosophy electives to make up the required 18 s.h.

Physics/Philosophy Option

See Physics.

COURSE DESCRIPTIONS

PHIL 100: 3 s.h.

Introduction to Philosophy (G1)

A beginning study of some of the major philosophical issues and thinkers.

PHIL 201: 3 s.h.

Philosophical Psychology (G1)

Intensive study of selected problems, figures or movements in psychology, with emphasis on the philosophical foundations or implications. Offered annually.

PHIL 202: 3 s.h.

Philosophies of Love and Sexuality (G1)

Various viewpoints regarding both the nature of love and of human sexuality. Offered annually.

PHIL 211: 3 s.h.

Introduction to Logic (G1)

Principles of correct thinking, deductive inference, inductive inference, and use and misuse of language in reasoning.

PHIL 280: 3 s.h.

Philosophies of Death and Dying (G1)

Various ways people have confronted death and have sought to understand it. Offered annually.

PHIL 285: 3 s.h.

Moral Problems in Medicine (G1)

A study of biomedical moral and ethical problems. Offered periodically.

PHIL 312: 3 s.h.

Mathematical Logic (G1)

First-order predicate calculus with identity and functional symbols. Offered annually. Prereq: PHIL 211 or some background in mathematics.

PHIL 313: 3 s.h.

World Religions (G1)

A study of the contents of certain living world religions. Offered annually.

PHIL 314: 3 s.h.

Philosophy of Science (G1, W)

The structure of scientific explanation; the logic character of scientific laws and theories; convention and description in science; probability and induction; the scientific method in the behavioral sciences. Offered periodically. Prereq: ENGL 110.

PHIL 321: 3 s.h.**Ancient Philosophy (G1, W)**

The pre-Socratics, Socrates, Plato and Aristotle. Offered fall. Prereq: ENGL 110.

PHIL 322: 3 s.h.**Modern Philosophy (G1, W)**

Descartes, Leibniz, Spinoza, Locke, Berkeley, Hume and Kant. Offered spring. Prereq: ENGL 110.

PHIL 327: 3 s.h.**Philosophy in Film (G1)**

Investigation of philosophical themes, problems and questions raised in film. The medium of film provides a rich and lively context to explore traditional and current issues pertinent to the discipline of philosophy.

PHIL 328: 3 s.h.**Philosophical Classics (G1, W)**

One or more major works of a major philosopher or philosophers. May be taken any number of times for credit. Offered annually. Prereq: ENGL 110.

PHIL 331: 3 s.h.**American Philosophy (G1)**

A study of philosophy in America. Offered periodically.

PHIL 341: 3 s.h.**Philosophical Analysis (G1, W)**

The origin and development of the analytical movement in philosophy. The relation among philosophy, logic and linguistics. Criticism from and comparison with other philosophical movements. Offered periodically. Prereq: ENGL 110.

PHIL 345: 3 s.h.**Humanity and Environment (P)**

Critical examination of the ways in which our understanding of the natural world affects our relationship with it as well as our concepts of human nature and society. Emphasis on how knowledge gained through the biological sciences (historically and presently) changes the way we think about ourselves and our place in the natural world. Specific topics include the social impact of evolutionary theory, sociobiology and evolutionary psychology, genetic engineering and aspects of environmental philosophy. Offered periodically. Prereq: COMM 100, ENGL 110 and junior status.

PHIL 351: 3 s.h.**Contemporary European Philosophy (G1)**

A study of the European philosophical traditions of hermeneutics, phenomenology, existentialism and structuralism in their historical context, and their relations to contemporary culture, particularly to psychology, literature, theology and political action. Offered periodically.

PHIL 361: 3 s.h.**Asian Philosophy (G1)**

A study of significant ideas in the philosophical thought of Asia. Offered periodically.

PHIL 373: 3 s.h.**Metaphysics (G1)**

Description and criticism of various metaphysical theories of reality. Offered periodically.

PHIL 381: 3 s.h.**Ethical Theories (G1, W)**

A study of selected moral issues and a critical analysis of the principal ethical theories. Offered periodically. Prereq: ENGL 110.

PHIL 382: 3 s.h.**Philosophy of Religion (G1)**

An examination of the justifiability of religion and of the nature of the religious experience, especially religious language. Offered infrequently.

PHIL 383: 3 s.h.**Philosophy of Art and Aesthetics (G1, W)**

The history of the philosophy of art; an analysis of the aesthetic experience, the aesthetic object and the creative act. Emphasis will be placed on an analysis of the concepts employed in the criticism of literature, painting and music. Offered periodically. Prereq: ENGL 110.

PHIL 391: 3 s.h.**Gender, Utopia and Human Nature (P)**

Utopian thought, from classical philosophy to contemporary science fiction. Shows how different cultures have portrayed gender and gender roles as fixed by human nature or as manifestations of alterable social institutions. Prereq: COMM 100, ENGL 110, junior status and two courses in one area of the social sciences or two courses in philosophy. Offered periodically.

PHIL 401: 3 s.h.**Philosophy and Neuroscience: Brains, Persons and Culture (G1)**

Examination of the interrelation between philosophy and neuroscience. Topics covered include perception, the nature of consciousness, the self and self-awareness, neuroscience of free will, neuro-ethics, and the cognitive neuroscience of language. Offered periodically. Prereq: ENGL 110 and 3 credits in philosophy or permission of instructor.

PHIL 407: 3 s.h.**Political and Social Philosophy (G1)**

An examination of political and social philosophies with a view to discovering their relation to present political and social realities. Offered periodically.

PHIL 471: 3 s.h.**Advanced Seminar in Philosophy (G1, W)**

Explores the core philosophical issues concerning theories of truth, knowledge and objective values. Emphasizes the development of the skills of critical reading and writing as well as performing philosophical research. May be taken any number of times for credit. Offered annually. Prereq: ENGL 110 and 3 credits in PHIL at the 200 level or higher (excluding PHIL 211 and 312), or permission of instructor.

PHIL 498: Variable credit**Independent Study**

For further information on independent study, see the *Special Academic Opportunities* section.

PHYSICS

College of Science and Technology

Assistant Professor Hendrick, chairperson

Professors Dushkina, Nolan, Uy

Associate Professors Gilani, Goksu

Assistant Professors Dixon, Li

The Department of Physics offers nine programs leading to the baccalaureate degree with a major in physics. The course structure recommended by the department is essentially identical during the first two years of all programs so that a revision in a student's plan need not involve any loss of time.

The greatest flexibility is found in the liberal arts (B.A.) program, which invites interdisciplinary studies in areas such as biophysics, geophysics, physical oceanography, chemical physics, mathematical physics or astronomy. The program can also be tailored to prepare a student for immediate employment or for graduate study in various areas such as medicine, law, engineering, business management, scientific journalism, nanotechnology and others for which an undergraduate major in physics is valuable.

The Bachelor of Science degree in physics involves the greatest depth in physics and mathematics. This program prepares the student for employment in a technical position upon graduation and also provides a solid foundation for entrance into a graduate program in physics or other technical field.

The physics dual-degree program requires three years of study at Millersville in the liberal arts curriculum, with a physics major plus two years in residence in the engineering program at the cooperating institution, Penn State University. At the end of the five years, the student receives two baccalaureate degrees: a B.A. in physics from Millersville and a B.S. in engineering from the cooperating engineering school.

In addition to the 3/2 arrangement with Penn State, we have three other cooperative programs. One of these is a 4/2 program with Penn State. A student studies for four years at Millersville and earns a B.S. degree in physics. After transferring to Penn State, in two years the student earns a master's degree from the Department of Engineering Science and Mechanics. In practice, it is possible to complete this program in less than two years. Up to six undergraduate credits at the 400 level in physics or mathematics may be transferred as graduate credit towards the master's degree at Penn State. Summer research programs at Penn State are also available and can generate graduate credit in this program. Consequently a student can finish the graduate portion of this program in a year and a half.

The other cooperative program we have with Penn State leads to a B.A. degree from Millersville with an option in nanotechnology. The standard courses for our B.A. physics degree are required. However, the student also spends a semester at the Penn State Nanofabrication Facility and earns 18 credits learning the use of specialized nanotechnology devices and techniques. The semester at Penn State typically occurs during the junior year.

Finally, the Physics Department and the Department of Materials Science and Engineering at the University of Delaware have initiated a 3/2 program. In this program, the student spends three years at Millersville and two years at the University of Delaware. Upon completion of the requirements, the student is awarded a Bachelor of Physics from Millersville and a master's degree in Materials Science and Engineering from the University of Delaware.

The program in secondary education prepares students for careers in precollege teaching, providing certification in physics.

The cooperative education program in physics is an optional arrangement whereby students combine practical on-the-job experience with their formal classroom instruction. After the freshman year, the co-op program is available to all physics majors in the B.A. and B.S. programs who satisfy the departmental admission requirements. For more information, see *Cooperative Education* in the *Special Academic Opportunities* section.

Outstanding students majoring in physics may pursue departmental honors during their senior year. Participation in the departmental honors program is highly selective and offers students in each of our major programs an opportunity to strengthen their background in physics and to work closely with a faculty mentor on an extended research project. General information on departmental honors is found in the *Special Academic Opportunities* section of this catalog. Specific requirements for honors in each of our major programs are available from the department chairperson.

Two minor programs are also available for students who do not elect to major in physics. The physics minor offers students an exposure to physics through the intermediate level of our major program. In addition, there is also available an interdisciplinary minor in physics and earth sciences.

The department has prepared a student handbook which provides more detailed information on our programs, faculty and resources. This handbook, as well as additional information on any of the above programs, is available from the physics department.

COURSE REQUIREMENTS

Students majoring in physics are required to attain a grade of C- or higher in MATH 161-211 and PHYS 231-232 before moving on to courses which have these courses as prerequisites.

Physics Major (B.A.): 120 s.h. minimum

32 s.h. in physics: PHYS 231, 232, 233, 266, 311, 321, 334, 335, 351, 492, 498. Required related courses: CHEM 111, 112; FORL 101, 102 or competency; MATH 161, 211, 311, 365; plus four additional 200-, 300- and 400-level courses selected from any department with approval of advisor. Foreign language competency required through elementary level. Students presenting two years of successful high school study in one language satisfy this requirement.

Physics Major (B.S.): 120 s.h. minimum

48 s.h. in physics: PHYS 231, 232, 233, 266, 311, 321, 331, 334, 335, 351, 352, 395, 451, 471, 492, 498; plus 6 credits, including one 400-level physics course and either PHYS 312 or 322. Required related courses: CHEM 111, 112; MATH 161, 211, 311, 322, 365; plus an additional 3 credits in mathematics at or above the 200 level.

Physics Major (B.A.): 120 s.h. minimum

Computer Science Option

29 s.h. in physics: PHYS 231, 232, 233, 311, 321, 334, 335, 351, 352, 492, 498. 24 s.h. in computer science: *CSCI 140, 161, 162, 370, 362 and one 4 s.h. CSCI elective. Required related courses: CHEM 111, 112; FORL 101, 102 or competency; MATH 161, 211, 311, 365. Foreign language competency required through elementary level. Students presenting two years of successful high school study in one language satisfy this requirement.

*The CSCI courses satisfy the requirements for a minor in computer science.

Physics Major (B.A.): 120 s.h. minimum

Physics/Meteorology Option

32 s.h. in physics: PHYS 231, 232, 233, 266, 311, 321, 334, 335, 351, 492, 498. Required related courses: CHEM 111, 112; FORL 101, 102 or competency; MATH 161, 211, 311, 365; *ESCI 241, 340, 341, 342, 343, 441, 444. Foreign language competency required through elementary level. Students presenting two years of successful high school study in one language satisfy this requirement.

Physics Major (B.A.): 120 s.h. minimum

Nanotechnology Option

35 s.h. in physics: PHYS 231, 232, 233, 266, 311, 321, 334, 335, 351, 492, 498, plus PHYS 431 or 471. Required related courses: CHEM 111, 112; MATH 161, 211, 311, 365; and FORL 101, 102 or competency; plus 18 s.h. earned at the Penn State Nanofabrication Facility. Foreign language competency required through elementary level. Students presenting two years of successful high school study in one language satisfy this requirement.

Physics Major (B.A.): 120 s.h. minimum

Physics/Philosophy Option

35 s.h. in physics: PHYS 231, 232, 233, 266, 311, 321, 334, 335, 351, 435 or 471, 492, 498. Required related courses: CHEM 111, 112; FORL 101, 102 or competency; MATH 161, 211, 311, 365; *PHIL 312, 314, 321, 322, 328 or 371 and one PHIL elective. Foreign language competency required through elementary level. Students presenting two years of successful high school study in one language satisfy this requirement.

*The PHIL courses fulfill the requirements for a minor in philosophy.

Physics Major (B.A.): 120 s.h. minimum

Polymer Chemistry Option

32 s.h. in physics: PHYS 231, 232, 233, 266, 311, 321, 334, 335, 351, 492, 498. 19 s.h. in chemistry: CHEM 111, 112, 235, 381, 482. Required related courses: FORL 101, 102 or competency; MATH 161, 211, 311, 365. Foreign language competency required through elementary level. Students presenting two years of successful high school study in one language satisfy this requirement.

Physics Major (B.A.): 120 s.h. minimum

Physics Dual-Degree Program

32 s.h. in physics at Millersville University: PHYS 198, 231, 232, 233, 266, 311, 321, 334, 335, 351, 492, 498. Required related courses: CHEM 111, 112; MATH 161, 211, 311, 365; ENGL 312. Specific engineering curricula have additional requirements. Students MUST consult their advisors or the physics department coordinator for cooperative engineering.

Physics Major (B.S.Ed.): 125 s.h.

Secondary Education Certification

36-37 s.h. in physics: PHYS 231, 232, 233, 266, 311, 317 or ESCI 241, 321, 334, 335, 351, 352, 492, 498. Required related courses: CHEM 111, 112; MATH 161, 211, 311, 365. Professional education: EDFN 211, 241, 330; EDSE 321, 435, 461. Refer to *Admission to Advanced Professional Studies and Certification (Education Majors)* in this catalog for more information.

Physics Minor

19 s.h. in physics: PHYS 231, 232, 233, 334, 335; Prereq or coreq: MATH 161, 211, 311.

Heliophysics and Space Weather Minor

PHYS 233, 321, 322; ESCI 341 or PHYS 334, PHYS 335, ESCI 440; PHYS 435 recommended. Total 18 s.h.

COURSE DESCRIPTIONS

PHYS 101: 3 s.h.

Survey of Physics (G2)

An elementary treatment of fundamental concepts of classical and modern physics. Selected examples from classical mechanics, electromagnetism, thermodynamics, relativity and quantum mechanics. The solving of numerical problems is de-emphasized. 3 hrs. lec. and discussion. No credit in block G2 for majors in the College of Science and Technology. Credit will be granted for only one of the courses: PHYS 101, 103 or 104. Offered spring. Prereq: MATH placement at the 100 level or above.

PHYS 103: 4 s.h.**Elements of Physics (G2, L)**

An elementary treatment of fundamental concepts of classical and modern physics. Selected examples from classical mechanics, electromagnetism, thermodynamics, relativity and quantum mechanics. The solving of numerical problems is de-emphasized. 3 hrs. lec., 2 hrs. lab. No credit in block G2 for majors in the College of Science and Technology. Credit will be granted for only one of the courses: PHYS 101, 103 or 104. Offered fall, periodically in spring.

PHYS 104: 4 s.h.**Applied Physics (G2, L)**

A study of the application of mathematics to practical problems in physics, using Newtonian ideas, and emphasizing applications to devices such as machines and engines, and systems such as electrical circuits. 3 hrs. lec., 2 hrs. lab. No credit in block G2 for majors in the School of Science and Mathematics. Credit will be granted for only one of the courses: PHYS 101, 103 or 104. Offered spring. Prereq: math placement at the 100 level or above.

PHYS 117: 3 s.h.**General Astronomy (G2)**

Astronomy for a general audience; emphasis on the physical nature of the universe. Terrestrial astronomy, light, telescopes, spectra, stars, stellar evolution, galaxies, cosmology, the solar system. 3 hrs. lec. and discussion. No credit in block G2 for majors in the College of Science and Technology. Offered fall, spring.

PHYS 131: 4 s.h.**Physics I with Algebra (G2, L)**

An introductory algebra-based course. Fundamental laws and properties of matter, mechanics and heat. Problems dealing with these laws. 3 hrs. lec., 1 hr. recitation and 2 hrs. lab. Prereq: MATH 101 or MPT score sufficient for the student to enroll in MATH courses above MATH 110. Offered fall, summer.

PHYS 132: 4 s.h.**Physics II with Algebra (G2, L)**

Continuation of PHYS 131. Fundamental laws and properties of electricity, magnetism, waves, sound, light and radiation. 3 hrs. lec., 1 hr. recitation and 2 hrs. lab. Offered spring, summer. Prereq: PHYS 131 or 231.

PHYS 205: 3 s.h.**Musical Acoustics (G2, L)**

Intended for musicians dealing with the physical nature of sound and sound sources, and the relation of these to music and musical instruments. The use of mathematics is kept to a minimum. 2 hrs. lec., recitation, 2 hrs. lab. Offered spring. Prereq: MUSI 112.

PHYS 230H: 1 s.h.**General Physics Seminar (G2)**

The ideas of introductory physics in extended depth in the language of calculus, using problems, laboratory exercises, readings and discussion. Grades of B- or higher in both PHYS 231 and PHYS 230H will result in honors designation for the pair. The pair of courses count as one entry in the science component of the curriculum record form and result in six hours of general education credit. 1 hr. discussion. Offered fall, spring. Coreq: concurrent registration in PHYS 231 required and either good standing in the Honors Program or a 3.35 GPA or permission of instructor.

PHYS 231: 5 s.h.**Physics I with Calculus (G2, L)**

An introductory course in classical physics dealing with mechanics, fluids, waves and thermodynamics. 3 hrs. lec., 1 hr. recitation, one 3-hr. lab. Offered fall, spring, summer. Prereq: C- or higher in MATH 161.

PHYS 232: 5 s.h.**Physics II with Calculus (G2, L)**

Continuation of PHYS 231. An introductory course in classical physics dealing with electricity, magnetism and optics. 3 hrs. lec., 1 hr. recitation, one 3-hr. lab. Offered fall, spring, summer. Prereq: C- or higher in PHYS 231. Coreq: MATH 211.

PHYS 233: 3 s.h.**Modern Theories of Waves and Particles**

Selected topics from the areas of waves and optics, special relativity, an introduction to the concepts and development of modern physics and single-particle quantum mechanics. 3 hrs. lec. Offered spring. Prereq: C- or higher in PHYS 232. Coreq: MATH 311.

PHYS 266: 3 s.h.**Electronics**

The fundamentals of analog devices and their application to electronic circuits. Operational amplifiers, power supplies, semiconductor devices, oscillators and an introduction to integrated circuits. Two 3-hr. labs. Offered spring. Prereq: PHYS 132 or 232. Coreq: MATH 161.

PHYS 302: 3 s.h.**Physics and the Evolution of Western Civilization (P)**

The history of the mechanization of the world picture. A study of physics in the evolution of Western civilization and thought relating the impact of the Newtonian revolution on technology, society and thought. 3 hrs. lec. and discussion. Offered periodically. Prereq: a physical science course, COMM 100, ENGL 110 and junior status.

PHYS 311: 3 s.h.**Mechanics I**

Lectures, problems and demonstrations developing the fundamental principles and concepts of classical mechanics, including Newton's laws of motion in three dimensions, conservation laws, linear and nonlinear oscillating systems, gravitation and central force problems. 3 hrs. lec. Offered fall. Prereq: C- or higher in PHYS 232. Coreq: MATH 365.

PHYS 312: 3 s.h.**Mechanics II**

A continuation of PHYS 311. Includes classical analysis of rigid body motion, noninertial frames of reference, Lagrangian and Hamiltonian dynamics, systems of coupled oscillators, plus special topics. 3 hrs. lec. Offered spring. Prereq: PHYS 311.

PHYS 317: 3 s.h.**Introduction to Astronomy and Astrophysics**

An overview of astronomy and astrophysics for students majoring in the sciences or mathematics, emphasizing selected areas such as terrestrial astronomy, celestial mechanics, stellar evolution, cosmology and the solar system. 3 hrs. lec. Offered fall of odd years. Prereq: a year of college-level physics and calculus.

PHYS 321: 3 s.h.**Electromagnetic Fields I**

Electrostatic and magnetic fields in vacuum and in dielectric and magnetic materials. Maxwell's equations are developed. 3 hrs. lec. Offered spring. Prereq: PHYS 233, 334. Coreq: MATH 365.

PHYS 322: 3 s.h.**Electromagnetic Fields II**

Consequences of Maxwell's equations. Solutions to Laplace's equation, electromagnetic radiation and relativistic electrodynamics are discussed. 3 hrs. lec. Offered fall. Prereq: PHYS 321. Coreq: PHYS 335.

PHYS 331: 2 s.h.**Fundamentals of Optics**

Lab-based course in physical optics, including applications of geometrical optics such as image formation by mirrors and lenses, microscopy, reflection, refraction, and basic phenomena in wave and quantum optics such as interference, diffraction, color mixing and filtration, polarization, birefringence, absorption, dispersion, scattering, laser properties and laser application. 1 hr. lec., 3 hrs. lab. Offered fall. Prereq: PHYS 232 or PHYS 132 and MATH 211.

PHYS 334: 3 s.h.**Macroscopic Phenomena and Thermodynamics**

Lectures, problems and demonstrations which develop the basic ideas of classical continuum physics and the macroscopic behavior of solids, liquids and gases, including an introduction to fluid dynamics, stress-strain relationships in solids, electric and magnetic properties of materials, phase transitions, superconductivity and the classical laws of thermodynamics. 3 hrs. lec. and discussion. Offered spring. Prereq: C- or higher in PHYS 232. Coreq: MATH 311.

PHYS 335: 3 s.h.**Multiparticle Quantum Systems and Statistical Physics**

Multi-electron atoms, statistical mechanics of classical and quantum systems and introduction to nuclear physics. Principles are applied to selected examples. 3 hrs. lec. Offered fall. Prereq: PHYS 233, 334.

PHYS 345: 3 s.h.**Symbolic Computational Methods in Physics**

Symbolic computational methods involving procedural, functional, rule-based programming and pattern matching using the graphical and numerical capabilities of Mathematica or other integrated mathematical software systems, with applications to a broad range of computationally challenging problems in physics. Offered fall of odd years. Prereq: PHYS 233. Coreq: PHYS 311 and MATH 365.

PHYS 351: 1 s.h.**Intermediate Physics Laboratory I**

Selected experiments in classical and modern physics introducing a variety of experimental techniques. 3 hrs. lab. Offered fall. Prereq: PHYS 233 and 266 or CSCI 370.

PHYS 352: 1 s.h.**Intermediate Physics Laboratory II**

Continuation of PHYS 351. 3 hrs. lab. Offered spring. Prereq: PHYS 351.

PHYS 360: 4 s.h.**Linear Circuit Analysis**

Mathematical analysis of linear circuits in the complex domain. Differential equations, operators, transfer functions, Laplace transforms and computer simulation with SPICE. 4 hrs. lec. Offered infrequently. Prereq: PHYS 266 and MATH 365.

PHYS 365: 3 s.h.**Digital Electronics**

Introduction to digital electronics and microprocessors. Design and analysis of combinatorial and sequential digital circuits, microcomputer interfacing and assembly programming. Two 3-hr. labs. Offered infrequently. Prereq: CSCI 140 or permission of instructor.

PHYS 366: 3 s.h.**Microelectronic Circuit Analysis**

Continuation of PHYS 266. Analysis and design of microelectronic circuits. Analytical treatment of discrete and integrated analog and digital circuits. 3 hrs. lec. Offered infrequently. Prereq: PHYS 266, 360 or permission of instructor.

PHYS 395: 3 s.h.**Techniques in Mathematical Physics**

Treatment of advanced mathematical techniques such as complex analysis, matrices, Fourier series, calculus of variations, special functions and integral transforms applied to selected areas of physics. Offered spring. Prereq: PHYS 233, MATH 365.

PHYS 431: 3 s.h.**Solid-State Physics**

Classical and quantum analyses of solid matter. Topics include crystal structure, the reciprocal lattice and X-ray diffraction; mechanical properties-phonons; semiclassical analysis of electrical and magnetic properties of insulators and metals; electron band theory of metals, insulators and semiconductors. 3 hrs. lec. Offered spring of odd years. Prereq: PHYS 335.

PHYS 435: 3 s.h.**Statistical Mechanics**

Lectures, problems and computer simulations developing the fundamental principles of classical and quantum statistical mechanics. Subjects include probability theory, the foundations of ensemble development and their application to classical, Fermi and Bose systems. Of special interest is the phenomenology of phase transitions and the modern development of the renormalization group. Offered fall of even years. Prereq: PHYS 335.

PHYS 451: 1 s.h.**Advanced Physics Laboratory I**

Selected experiments in classical and modern physics, with opportunities to apply sophisticated techniques to extended experimental problems. 3 hrs. lab. Offered fall. Prereq: PHYS 352.

PHYS 452: 1 s.h.**Advanced Physics Laboratory II**

Continuation of PHYS 451. 3 hrs. lab. Offered spring. Prereq: PHYS 451.

PHYS 462: 3 s.h.**Advanced Electronics**

Microprocessor applications and interfacing, real-time programming. Topics are selected from computer design, control loops, phase-locked loops and communications. Two 3-hr. labs. Offered infrequently. Prereq: PHYS 266, 365 or permission of instructor.

PHYS 471: 3 s.h.**Quantum Mechanics**

An introduction to formal quantum theory in terms of operators on a Hilbert space. Dirac notation is introduced and used in the solution of the eigenvalue problems for the harmonic oscillator and angular momentum by operator techniques. Other topics include the dynamics of a spin-1/2 particle, the addition of angular momentum and perturbation theory. Offered fall. Prereq: MATH 322, MATH 365 and PHYS 335 or permission of instructor.

PHYS 492: 2 s.h.**Physics Research and Seminar**

The first semester of an independent research experience supervised by a faculty mentor. Attendance at weekly seminars is also required. Offered fall. Prereq: PHYS 335 and 351.

PHYS 493: 1-3 s.h.**Topics in Astronomy and Astrophysics**

Selected topics chosen from the areas of astronomy and astrophysics. Permission of instructor. Offered infrequently.

PHYS 494: 1-3 s.h.**Topics in Classical Physics**

Selected topics chosen from the areas of classical physics. Permission of instructor. Offered infrequently.

PHYS 495: 1-3 s.h.**Special Topics in Theoretical Physics**

Lecture course in selected topics of current interest in theoretical physics, such as nuclear structure, elementary particle physics, advanced quantum mechanics, plasma physics, general relativity, nonlinear dynamics, Lie groups and their physics application, statistical mechanics, condensed-matter physics and biophysics. Prereq: MATH 365, PHYS 233 or permission of instructor. Offered infrequently.

PHYS 496: 1-3 s.h.**Topics in Applied Physics**

A study of the application of selected physics concepts in experimental physics. Permission of instructor. Offered infrequently.

PHYS 497: 1-3 s.h.**Topics in Modern Physics**

Topics chosen from areas of modern physics. Permission of instructor. Offered infrequently.

PHYS 498: 1-3 s.h.**Physics Research and Seminar/Independent Study**

An independent research experience supervised by a faculty mentor. Attendance at the weekly seminars associated with PHYS 492 is also required. Prereq: PHYS 492 or permission of instructor. Offered fall, spring.

POLITICAL SCIENCE

See Government & Political Affairs

POLYMER CHEMISTRY

See Chemistry and Physics

PRE-ATHLETIC TRAINING

See Biology and Wellness & Sport Sciences

PRE-LAW

Students interested in pursuing a career in law should consult with the Department of Government & Political Affairs early in their academic careers.

PRE-MEDICINE

See Biology and Chemistry

PRE-OPTOMETRY

See Biology

PRE-PODIATRY

See Biology

PSYCHOLOGY

College of Education and Human Services

Professor Foster-Clark, chairperson

Associate Professor Thyrum, assistant chairperson

Professors Tuleya-Payne, Kelly, Smith-Wade-El, Woo

Associate Professors Baker, Bennis-Suter, Gallagher, Garner, Haferkamp, Rush, Vredenburg-Rudy

Assistant Professors Banna, Bland, Cook, Lopez, Sorhagen

The Department of Psychology offers a B.A. degree in psychology, double majors with sociology and philosophy, a departmental honors program and a selection of elective courses for all Millersville University students. Psychology majors, through departmental advisement, usually plan a program that leads to one of three goals: (1) graduate with a bachelor's degree and enter the human service field; (2) graduate with a bachelor's degree and enter the business/industrial field; or (3) graduate with a bachelor's degree and enter graduate school for advanced study in psychology or related fields.

A minor in psychology is also available to undergraduate students. It provides a general survey of the field and training in psychological research methods.

Some undergraduate psychology courses are open to liberal arts and teacher education students. However, some laboratory, specialized and upper-level courses are open only to psychology majors and minors.

The cooperative education program in psychology is an optional arrangement whereby students combine practical on-the-job experience with their formal classroom instruction. The co-op program is available to all psychology majors who satisfy the departmental admissions requirements. For further information, see *Cooperative Education* in the *Special Academic Opportunities* section of this catalog.

DEPARTMENTAL POLICIES

The Admission to the Major Policy and the Retention in the Major Policy apply to all majors enrolled in the psychology B.A. program.

Admission to the Major Policy

Readmitted students must have a 2.25 or higher CGPA at Millersville University since readmission in order to be admitted to the psychology major. Current students at Millersville University will be permitted to declare psychology as a major only if they have a CGPA of 2.25 or higher, based on at least 15 credit hours, including PSYC 100, and if space is available. Decisions to accept new majors are based in part on space available and hence are competitive based upon previous academic performance, both in psychology courses and overall, and on math preparation.

Retention in the Major Policy

At the end of each semester, the psychology department will review the academic performance of its majors. If any student with zero to 29.5 earned credits has a CGPA below 2.0, or if any student with 30 to 59.5 earned credits has a CGPA below 2.25, he/she will be notified by the department that he/she has been placed on probation in the major status for the semester in which notification is made. The department will specify minimal achievement during the probationary semester to continue in the major. If the student is not successful in meeting the requirements during the probationary semester, he/she will be removed from the major.

Students must successfully complete PSYC 211 prior to completing 90 credit hours and successfully complete two required courses and two core electives prior to completing 90 credit hours.

Completion of the Major Policy

Students must earn a C- or higher in all required psychology courses as defined in the catalog and curriculum (blue) sheet. The policy currently applies to the 15 credits of coursework required in the major (PSYC 100, 211, 212 and an Advanced Lab – currently one of PSYC 314, 315, 316) but not to elective courses (Core or General) taken to complete their psychology requirements.

Policy Regarding Advanced Placement (AP) Credit in Psychology

Entering students who receive a score of 3 on the Advanced Placement (AP) Examination in Psychology shall be awarded three credits for an elective course designated as a 100-level PSYC course. Entering students who receive a score of 4 or 5 on the AP examination shall be awarded three credits for PSYC 100.

Pass/Fail Restriction on Courses for Psychology Majors and Minors

Psychology majors may not take any psychology courses or any required related courses on a pass/fail basis. Psychology minors may not take any psychology courses on a pass/fail basis.

Policy on Credit Restriction for Developmental Psychology Courses

The psychology department offers three undergraduate developmental psychology courses: PSYC 227, 228 and 229. Credit is awarded for any one of the individual courses. Credit is also awarded for the combination of PSYC 227 and 229, but not for any other combination of developmental psychology courses.

Policy Regarding Cooperative Education and Directed Projects in Psychology

A limit of 6 s.h. of cooperative education (PSYC 300, 400 or 500) or PSYC 495 or any combination of the two may be taken by a student and counted in the psychology major. In unusual circumstances, and with written permission of the student's faculty advisor, the directed projects instructor and the department of psychology's cooperative education advisor, up to 6 additional s.h. may be taken; however, these credits may not be counted toward the psychology major.

COURSE REQUIREMENTS**Psychology Major (B.A.): 120 s.h.**

33 s.h. in psychology. Required psychology courses (15 s.h.): PSYC 100, 211, 212; one of PSYC 314, 315, 316; an additional four courses (12 s.h. minimum) of psychology core electives (PSYC 215, 227, 228, 229, 314, 315, 316, 317, 329, 335, 337, 356, 417, 454) and 6 s.h. of psychology general electives (PSYC 234, 246, 256, 311, 318, 319, 328, 346, 350, 357, 365, 403, 415, 427, 447, 455, 462, 489, 490, 495, 496, 498, 499). Advanced laboratory courses (PSYC 314, 315, 316) not taken as part of the 15 s.h. of required psychology courses may be counted in the block of core electives. Up to 6 s.h. of psychology core electives taken in excess of the required 12 s.h. may be substituted for psychology general electives. Required related courses are BIOL 100, one philosophy course, one sociology course.

The following categories are suggested to help the student organize his/her curriculum in psychology:

Human Services: Select courses from among the following psychology electives: PSYC 227, 228, 229, 234, 256, 311, 328, 335, 337, 346, 356, 403, 417, 447 and 495. Recommended related courses are BIOL 256; SOCY 210, 216, 316, 317; SOWK 102.

Business and Industrial: Select courses from among the following psychology electives: PSYC 234, 256, 311, 317, 318, 319, 329, 335, 346 and 495. Recommended related courses are CSCI 101; BUAD 101, 251, 351, 352; ECON 100, 101, 102.

Preparation for Graduate Study: In addition to the required psychology courses, all of the following are strongly recommended: PSYC 227, 314, 315, 316, 317, 335, 337, 415, 417 and 454.

Psychology-Sociology Double Major (B.A.): 120 s.h.

Psychology requirements: 33 credits of psychology and the required related courses as listed under the major. One course from SOCY 210, SOCY 230, SOCY 313, SOCY 315, SOCY 316, SOCY 317 or SOCY 338 may be credited as general electives in psychology. Sociology requirements: 31 credits of sociology and the required related courses as listed under the sociology major. One course from PSYC 227, PSYC 228, PSYC 317 or PSYC 335 may be credited as an elective in sociology.

Psychology-Philosophy Double Major (B.A.): 120 s.h.

Psychology requirements: 33 credits of psychology and the required related courses as listed above for the major. One course from PHIL, including PHIL 201, PHIL 202, PHIL 211 or PHIL 401, may be credited as a psychology general elective, as long as it is not used as the required related philosophy course.

Philosophy requirements: 30 credits of philosophy as listed under the philosophy major. PSYC 454 may be credited as an elective in philosophy.

Psychology Minor: 19 s.h.

19 s.h. in psychology. Required psychology courses are PSYC 100 and PSYC 211; an additional 12 s.h. of psychology electives, at least two courses of which must be at the 300 level or above.

COURSE DESCRIPTIONS**PSYC 100: 3 s.h.****General Psychology (G3)**

An introduction to the study of behavior and mental activity, including such aspects as motivation, emotions, sensation and perception; individual differences; the nervous system; learning and personality with a view of understanding behavior.

PSYC 211: 4 s.h.**Principles of Statistics and Experimental Design I (W)**

An introduction to research methods and design, and to statistical analysis of psychological data. 3 hrs. lec., 2 hrs. lab. Prereq: ENGL 110 and PSYC 100 and MATH 101, MATH 105, MATH 204 or MATH 130 with a minimum grade of C- or Math Placement into MATH 130 or above.

PSYC 212: 4 s.h.**Principles of Statistics and Experimental Design II**

A study of standard experimental designs and statistical procedures widely used in psychological research. 3 hrs. lec., 2 hrs. lab. Prereq: PSYC 211 with a grade of C- or higher and MATH 101 or MATH 130 with a minimum grade of C- or Math Placement into MATH 130 or above.

PSYC 215: 3 s.h.**Introduction to Physiological Psychology**

Serves as an introduction to the nervous system in relation to cognition and behavior. It will begin at the cellular level, building up to the systems level. Offered fall, spring. Prereq: BPE 100 OR BIOL 100 or BIOL 101 and PSYC 100.

PSYC 227: 3 s.h.**Development of the Child and Adolescent (G3)***

A study of the theory and research pertaining to the growth, development and behavior of children through adolescence. Prereq: PSYC 100. No credit given if credit earned for PSYC 228.

PSYC 228: 3 s.h.**Life Span Human Development (G3)***

A focus upon the major stages of human development, beginning with infancy and continuing through the developmental changes of childhood, adolescence and adulthood through to old age and death. Cognitive and psychosocial aspects of human development are emphasized. Offered periodically. Prereq: ENGL 110 and PSYC 100. No credit given if credit earned for PSYC 227 or 229.

PSYC 229: 3 s.h.**The Adult Years (G3)***

An examination of the years from young adulthood to retirement. Focuses on intimate relationships, family, parenting and other enduring commitments. Offered periodically. Prereq: PSYC 100. No credit given if credit earned for PSYC 228.

*Psychology majors may count only one of these three courses as a core elective.

PSYC 234: 3 s.h.**Human Relations (G3)**

An examination of human interactions, both historically and currently, in diverse structures (e.g., family, social, educational, political, economic, etc.). Course content targets increased awareness and understanding of values, traditions and rites of dominant and minority groups, and their effect upon interpersonal and intergroup relations. Offered periodically.

PSYC 246: 3 s.h.**Evolutionary Psychology**

Reviews evolutionary theory, surveys research and, most importantly, explains how Evolutionary Psychology can be applied to disciplines within and beyond the field of psychology. Offered periodically. Prereq: BPE 100 or BIOL 100 or BIOL 101 and PSYC 211.

PSYC 256: 3 s.h.**Psychology of Human Adjustment (G3)**

An examination of factors that shape personal and social behavior, with a focus on basic issues, problems and therapies as they relate to personal adjustment. Offered fall, spring. Prereq: PSYC 100.

PSYC 300: 3 s.h. minimum**Cooperative Education in Psychology****PSYC 311: 3 s.h.****Psychology of Drug Addiction (G3, W)**

An investigation of the problems associated with drug addiction. Evaluations of opiates, stimulants, barbiturates, depressants, hallucinogens, marijuana and alcohol, with consideration of the effects of these drugs on the individual. Offered fall, spring. Prereq: ENGL 110 and PSYC 227 or 228 or 229 or 234.

PSYC 314: 4 s.h.**Cognitive Psychology**

A laboratory course designed to examine the nature of human memory, perception and thought, and to provide an introduction to the techniques used to study these phenomena. 3 hrs. lec., 2 hrs. lab. Offered fall, spring. Prereq: PSYC 211 and 212 with a grade of C- or higher.

PSYC 315: 4 s.h.**Sensation and Perception**

A laboratory course designed to develop an understanding of the models and theories of the sensory and perceptual systems. 3 hrs. lec., 2 hrs. lab. Offered fall, spring. Prereq: PSYC 211 and 212 with a grade of C- or higher.

PSYC 316: 4 s.h.**Learning and Motivation**

A theoretical laboratory course designed to investigate and apply the concepts of learning and motivation to both human and animal behavior. 3 hrs. lec., 2 hrs. lab. Offered fall, spring. Prereq: PSYC 211 and 212 with a grade of C- or higher.

PSYC 317: 3 s.h.**Social Psychology**

A review of the principles of social psychology derived from experimental study. Offered spring. Prereq: PSYC 100. PSYC 211 recommended.

PSYC 318/318H: 3 s.h.**The Psychology of Racism (D, P)**

Examination of individual and institutional racism in all its aspects, with an emphasis on the various psychological explanatory theories and supporting research as well as the various techniques for alleviating this problem. Additional overview of resultant effects on the victims. Prereq: COMM 100, ENGL 110, PSYC 100 and junior status.

PSYC 319: 3 s.h.**Psychology of African Americans (G3, W)**

History of psychology in relation to African Americans and approaches to African-American psychology. Examinations of theories, concepts and issues related to the behavior of African Americans. Offered periodically. Prereq: ENGL 110, PSYC 100.

PSYC 328: 3 s.h.**Selected Issues in Psychology and Religion: The Western Search for Meaning (P)**

An exploration of psychological and religious questions, issues and processes in the search to give meaning to one's personal and shared journey. Prereq: COMM 100, ENGL 110, PSYC 100 and junior status. Offered periodically.

PSYC 329: 3 s.h.**Industrial/Organizational Psychology (G3, W)**

A study of research and applications of psychology to the work setting. Knowledge of the psychological processes of learning, motivation, perception and assessment is used to analyze selection, training, work design and performance. Offered annually. Prereq: ENGL 110 and PSYC 100.

PSYC 335: 3 s.h.**Personality Theory (G3)**

An introduction to historic and contemporary theories of the human personality. Offered fall, spring. Prereq: PSYC 100.

PSYC 337: 3 s.h.**Abnormal Psychology (G3, W)**

A comprehensive study of the etiology, characteristics and treatment in the categories of abnormal behavioral manifestation. Offered fall, spring. Prereq: ENGL 110 and PSYC 100.

PSYC 346: 3 s.h.**Behavior Modification**

An examination of theory, research and techniques related to the modification of behavior, with special emphasis placed on the application of behavior-modification procedures in a variety of settings (e.g., family, school and industry). Offered fall, spring. Prereq: PSYC 100.

PSYC/CSCI 350: 3 s.h.**Cognitive Science (P)**

Basic introduction to cognitive science. Reviews attempts to understand cognition using insights from psychology, artificial intelligence, philosophy, linguistics and the neurosciences. Examines the synthesis of those attempts in the emergent field of cognitive science. Offered periodically. Prereq: COMM 100, ENGL 110 and junior or senior standing.

PSYC 356: 3 s.h.**Health Psychology**

A review of research and theory linking psychological factors to health. Discussion of psychosocial aspects of health behavior, pain, stress and the impact on biological systems. Evaluation of psychological and behavior interventions for health behavior change and chronic illness. Offered fall. Prereq: PSYC 100 and PSYC 227 or 228 or 229 or 234 or 256.

PSYC 357: 3 s.h.**Neuropsychology**

This survey course will provide a thoughtful and comprehensive introduction to the field of human neuropsychology, including the history, methods and logic of neuropsychological investigations. Offered periodically. Prereq: BIOL 100 or BIOL 101 and PSYC 211.

PSYC 365: 3 s.h.**Human Memory**

This survey course will provide a scientific introduction to human memory. The structure and processes of human memory will be covered. There will be consideration of the current and past research, as well as models on memory. Offered periodically. Prereq: BIOL 100 or BIOL 101 and PSYC 211

PSYC 400: 3 s.h. minimum**Cooperative Education in Psychology****PSYC 403: 3 s.h.****Family Systems: A Psychological Approach**

An investigation of the impact of the multigenerational family system on the individual. Assessment of functional and dysfunctional family systems. Emphasis upon theorists and their orientations and intervention strategies. Offered periodically. Prereq: PSYC 100 and junior or senior standing.

PSYC 415: 3 s.h.**Physiological Psychology**

A systematic examination of the nervous and sensory systems and their regulation of human behavior. May not be used in place of PSYC 314, 315 or 316 to fulfill the laboratory requirement. Offered fall. Prereq: PSYC 100 and PSYC 215 and one course in biology. Chemistry helpful. Junior or senior standing.

PSYC 417: 3 s.h.**Tests and Measurements**

An introduction to the basic principles of psychological testing and measurement. Focus is upon issues in test construction and design, evaluations of psychometric properties and applications of tests in various fields of psychology. Offered annually. Prereq: PSYC 211 or permission of instructor.

PSYC 427: 3 s.h.**Childhood Disorders**

An in-depth look at major childhood psychological disorders. Diagnostic criteria, etiology and developmental progression presented. Introduction to diagnostic assessment techniques and commonly used interventions. Offered annually. Prereq: PSYC 100 and PSYC 227 or 228, junior or senior standing.

PSYC 447: 3 s.h.**Counseling Strategies**

An introduction to the process and practice of counseling. Emphasis is placed on learning counseling theories and on counseling skills. Offered fall, spring. Prereq: PSYC 100, junior or senior standing.

PSYC 454: 3 s.h.**History and Systems of Psychology**

Study of the development of psychology from a branch of philosophy to a modern science. Offered fall. Prereq: PSYC 100.

PSYC 455: 3 s.h.**Senior Seminar in Psychology**

An advanced course devoted to critical analysis of student and professional research using staff consultant leadership. Offered periodically. Prereq: senior psychology majors only.

PSYC 462: 3 s.h.**Psychology and Creativity in Art, Music and the Written Word (P)**

Study of psychological processes involved in the production and experience of music, art and literature coupled with a review of psychological theories of human creativity. Key principles within the domain of psychology will be illustrated and explored through the study of the works of artists, musicians and writers. Offered summer. Prereq: PSYC 100, COMM 100, ENGL 110 and junior status. PSYC 335 recommended.

PSYC 489, 499: 1-4 s.h.**Departmental Honors**

For the definition of departmental honors and eligibility, refer to the *Academic Policies* section of this catalog.

PSYC 490: 1 s.h.**Honors Seminar**

Examination and discussion of current research issues in psychology. May be taken a maximum of three times. Enrollment limited to students with at least 45 s.h. who are applying to the psychology department honors program and to those already admitted to that program. Offered fall, spring. Prereq: permission of instructor.

PSYC 495: 1-6 s.h.**Directed Projects in Psychology**

Supervised field experience involving the application of psychological principles. Junior or senior standing. Prereq: permission of instructor. Insurance and recent clearances (Act 34/Act151/FBI clearances and TB test results) may be required, depending on the setting.

PSYC 496: 1-3 s.h.**Topics in Psychology**

Detailed investigation of a topic of current research interest. Topic to be announced each time course is offered. Credit and meeting hours variable, depending on topic offered. May be taken more than once for credit as topic varies. Offered periodically. Prereq: junior or senior standing and permission of instructor.

PSYC 498: 1-3 s.h.**Independent Study in Psychology**

For further information on independent study, see the *Special Academic Opportunities* section of this catalog.

GRADUATE-LEVEL COURSES

The following 500-level courses are open to qualified undergraduates with permission. For course descriptions, please refer to the *Graduate Catalog*.

PSYC 500: Variable credit
Cooperative Education in Psychology

PSYC 505: 3 s.h.
Recent Developments in Psychology

PSYC 511: 3 s.h.
Substance-Related Disorders

PSYC 525: 3 s.h.
Advanced Child Psychology

PSYC 526: 3 s.h.
Advanced Adolescent Psychology

PSYC 530: 3 s.h.
The Child in the Family System

PSYC 536: 3 s.h.
Applications of Biopsychology

PSYC 547: 3 s.h.
Applied Social Psychology

PSYC 566: 3 s.h.
Clinical Hypnosis

PUBLIC RELATIONS

See Communication & Theatre

RESPIRATORY THERAPY

See Biology

ROBOTICS & CONTROL SYSTEMS TECHNOLOGY

See Applied Engineering, Safety & Technology

RUSSIAN

See Foreign Languages

SECONDARY EDUCATION

See Educational Foundations

SOCIAL SCIENCES

College of Arts, Humanities and Social Sciences

SSCI 203H: 3 s.h.

Explorations in the History of Ideas (G3, W)

Topics in intellectual history, with an emphasis on the development of the “West” and its interactions with other civilizations and cultures. Required of freshman honors students. Offered fall. Prereq or coreq: member of University Honors College and ENGL110H.

SSCI 212: 3 s.h.

The Black Woman (G3)

A multidisciplinary course examining the history, sociology, anthropology and psychology of the black woman from antiquity to the present. The course will focus on the black woman in non-Islamic Africa and the United States. Offered spring.

NOTE: These courses do not satisfy the general education policy of “two courses must be from a single department.”

SOCIAL STUDIES

College of Arts, Humanities and Social Sciences

Social Studies (B.S.Ed.): 120 s.h.

This program is designed for students planning to teach economics, geography, government or history. The program consists of 30 s.h. of required core courses: two in economics, geography and government, and four in history. In consultation with an academic advisor, each student will select a concentration totaling 30 s.h. from among the following disciplines: anthropology (0-6), economics (3-15), geography (3-15), government (3-15), history (3-15), psychology (0-6) and sociology (0-6). Economics, government and history courses should be at the 200 level or higher unless otherwise noted. The program also consists of 33 s.h. of professional education courses, two math courses and two courses in the humanities or sciences that support the concentration.

Students wishing to teach anthropology, psychology or sociology in the secondary schools are required to complete the B.S.Ed. in social studies. As part of that program, the students should select a number of courses in anthropology, sociology and psychology to prepare for the certification exams in the social sciences. Additional courses beyond the social studies program may be necessary. Upon receiving the social studies certification, students can take the test for social sciences certification, which will allow them to teach anthropology, psychology and sociology.

SOCIAL WORK

College of Education and Human Services

Associate Professor Rice, chairperson
 Associate Professors Foels, Johnson, Walsh
 Assistant Professors Bethel, Felizzi, Girvin, Granruth, Proctor
 Instructor Frank

The social work program at Millersville University leads to a Bachelor of Arts degree in social work. Millersville's social work baccalaureate program is professionally accredited by the Council on Social Work Education. Based on the general education curriculum, the social work curriculum is designed to prepare students for beginning professional practice in social agencies and other settings where social workers are employed. The program educates the general practitioner; therefore, it is built on basic required courses. However, it also allows students to explore areas of interest through elective courses and field instruction assignments.

Affirming the mission of Millersville University, a public, liberal arts institution situated in south-central Pennsylvania, the baccalaureate social work program educates students to be competent, effective social work professionals who embrace core social work values, enhance human and community well-being, and promote social and economic justice through generalist social work practice. The University and the program provide a learning environment that prepares students to work in an increasingly diverse society and to meet contemporary social, cultural, economic, political and global challenges.

The social work undergraduate program is designed:

1. To help students integrate liberal arts and professional competencies into ethical generalist practice.
2. To prepare students for culturally competent practice in diverse communities and society.
3. To prepare students to practice in a manner that advances human rights and social and economic justice.
4. To facilitate students' understanding of social policy issues and their impact on the direct practice environment, and enable them to engage in effective policy practice.
5. To prepare students to engage in research-informed practice and practice-informed research.
6. To prepare students for continuing professional development and graduate education.

The curriculum is designed to help students integrate knowledge and theories from many academic disciplines with social work concepts, values and practice skills. Courses in the social work program attempt to develop an understanding of the human condition and human diversity. The social work major needs to understand biological, psychological and sociocultural aspects of human development; characteristics of human interaction with the social environment; the role, structure and function of social welfare policies and programs; social work intervention methods; and social work research findings and methods.

In addition to theoretical instruction, students are given ample opportunity for practical experience. The experiential requirements begin in the introductory courses and carry through to formal work in advanced courses. The culmination is 450 hours practicum during spring semester, wherein the student can integrate knowledge and skills in a social agency or other social service setting in the community.

A formal Professional Readiness Assessment process takes place for each student prior to placement in a social service setting for field instruction. Qualifications are based on academic performance, oral and written communication skills, demonstrated ethical behavior, values and commitment to social work as a career. The social work faculty has the right to dismiss from the program, at any time, students found not qualified for social work practice.

Upon completion of the undergraduate social work degree, graduates will be able to:

1. Identify as a professional social worker and conduct oneself accordingly.
2. Apply social work ethical principles to guide professional practice.
3. Apply critical thinking to inform and communicate professional judgments.
4. Engage diversity and difference in practice.

5. Advance human rights and social and economic justice.
6. Engage in research-informed practice and practice-informed research.
7. Apply knowledge of human behavior and the social environment.
8. Engage in policy practice to advance social and economic well-being and to deliver effective social work services.
9. Respond to contexts that shape practice.
10. Engage, assess, intervene and evaluate individuals, families, groups, organizations and communities.

COURSE REQUIREMENTS

Social Work Major (B.A.)

SOWK 102, 201, 203, 301-302, 303, 322, 323 (405), 350, 401-402, 403, 430-431 (330-331). A grade of C or higher must be attained in all required social work courses. Six additional elective credits from SOWK 304, 305, 306, 307, 308, 309, 312, 313, 314, 315. SOWK 401-402 must be taken concurrently with 431. Required related courses: BIOL 204, GOVT 111 or 112, PSYC 100, SOCY 101, 210 or 211.

COURSE DESCRIPTIONS

SOWK 102: 3 s.h.

Modern Social Welfare Dilemmas (G3)

Introduction to social work's approach to social problems, including how public-policy decisions affect individuals and families; overview of competing public-policy agendas in social welfare and alternative strategies for problem resolution; societal values and trends affecting service delivery; understanding social work in action; examining core concepts, values and ethics.

SOWK 201: 3 s.h.

Social Welfare Policy and Economics

This course offers a general understanding of economic theory as it applies to both microeconomic and macroeconomic decision making. The course comprises two major foci: 1) practical applications of decision-making paradigms for practice with individuals and families in the social work context; and 2) understanding the effects of economic conditions on social welfare policy, those who make policy and those who advocate for changes in the policy arena. Prereq: SOWK 102 or approval of instructor.

SOWK 203: 3 s.h.

Human Behavior and the Social Environment I

Examines the life span approach to human development, with focus on interaction between the individual's biopsychosocial functioning and the social environment. Analyzes the impact of human diversity on behavior in social situations, with particular emphasis on populations at risk. Studies how factors of human diversity affect social policy. Prereq: C or higher in SOWK 102 and sophomore status or permission of instructor. Prereq or coreq: BIOL 204, PSYC 100, SOCY 101, 210 or 211.

SOWK 301: 3 s.h.

Social Work Practice I (W)

Study of the wide range of activities that constitute the generalist social work approach. Designed to assist students to develop basic entry-level professional social work competencies within a systems framework. Junior field experience required. Prereq: ENGL 110. Prereq or coreq: SOWK 203, junior standing. SOWK majors only.

SOWK 302: 3 s.h.

Social Work Practice II

In-depth examination of the knowledge, values and skills that form the base of social work practice; method selection and skill development in social work intervention; practice with social work communication skills. Emphasis on practice with groups and vulnerable populations. Junior field experience required. Prereq: C or higher in SOWK 301. SOWK majors only.

SOWK 303: 3 s.h.

Social Welfare and the Law

Significant legislation, court decisions and regulatory language shape public social policy and affect the legal base for social work practice. Among substantive areas discussed are family law and policy, mental health and substance abuse law and policy, constitutional and civil rights, poverty law and policy, social welfare law and policy, and professional licensing. Prereq: C or better in SOWK 102 or permission of instructor; GOVT 111 or 112; SOWK majors only.

SOWK 304: 3 s.h.

Social Work, Corrections and Alternative Treatment Approaches (G3)

Provides students a general introduction to the study of the correctional system in the United States as well as assessment and treatment of adults and youth who may be at risk for interacting with the system. A historical perspective of adult and juvenile corrections will be offered along with discussions and examinations of the etiology and extent of crime as well as antecedents of violence, environmental and ecological factors for the causes of criminality, and assessment of adult offenders and at-risk youth and their families. A historical perspective, rehabilitation approaches, de-institutionalization, community-based programs and alternatives to incarceration will be reviewed.

SOWK 305: 3 s.h.

Social Work and Child Welfare

Concepts, policies and practices in child welfare services as a response to the needs of children and their families; focus on services designed to support, supplement or substitute for the care usually given by biological parents; social work practices and public-policy issues in foster care, adoption, day care, institutional care, protective services, teenage pregnancy and juvenile delinquency. Prereq: C or higher in SOWK 102 or permission of instructor.

SOWK 306: 3 s.h.**Social Work and Aging**

A developmental approach to the aging process as one phase of the life cycle; biological, psychological, social and economic needs of the elderly; analysis of societal provision for these needs; public-policy issues and pertinent social legislation; community-based programs of social and health services; techniques of generic social work with older persons; advocacy and policy planning for the aging. Lectures and discussion supplemented with audiovisual material, speakers and field visits as available. Volunteer experience with an older person or persons required. Prereq: C or higher in SOWK 102 or permission of instructor.

SOWK 307: 3 s.h.**Social Work and Healthcare**

Scope and contribution of professional social work in comprehensive healthcare settings focusing on individual and community health needs, social and behavioral aspects of illness, essential practice components and skills required of social workers, healthcare policy, issues and trends, alternative healthcare programs and research needs. Prereq: C or higher in SOWK 102 or permission of instructor.

SOWK 308: 3 s.h.**Social Work and Alcoholism**

Concepts, policies, issues, trends, theories and social work practice skills in the setting of alcoholism services. Focuses on interaction of affected individuals with others in family, social, economic, educational, legal and political systems. Examines the role of the social worker in identification, intervention and use of network of community resources. Prereq: C or higher in SOWK 102 or permission of instructor.

SOWK 309: 3 s.h.**Social Work and Mental Health**

Application of theory and social work values to practice with mentally disordered people, their families and service systems relating to their needs. Consideration of various practice modalities, including direct intervention as well as social policy analysis, research and prevention.

SOWK 312: 3 s.h.**Social Work and Women; Strengths, Needs and Opportunities (W, G3)**

Scope and contribution of professional social work in regard to women's issues and concerns in contemporary society. Emphasis on the analysis of individual and community women's needs, the social and behavioral aspects of women's concerns, the essential practice components and skills required of social workers, social welfare policy and women, issues and trends, alternative women's programs and research needs. Prereq: ENGL 110.

SOWK 313: 3 s.h.**Family Violence (P)**

Professionals and society at large have recognized violence in the family against children, spouses and the elderly as a social problem. Other emerging related issues include cross-cultural violence, partner violence in gay/lesbian relationships, courtship violence and date rape. Focus will also include theories of abuse with various populations as well as treatment approaches to the various forms of family violence. Prereq: COMM 100, ENGL 110 and junior status.

SOWK 314: 3 s.h.**Global Well-Being (D, P)**

This course is interdisciplinary and intercultural in nature. It is designed to prepare all students whose anticipated careers are primarily oriented to direct work with the global community, both domestically and internationally. There will be an emphasis on developing interpersonal communication skills for interacting with people whose way of life differs from one's own; developing insights into the multifaceted issues impacting our world; and understanding global interconnection with oppression to foster social justice. The cornerstone of this course is service-learning opportunities on a local and global level. Course content is presented in the traditional (face-to-face) classroom, with portions of the class held online. Prereq: COMM 100, ENGL 110, 24 s.h. General education, junior standing.

SOWK 315: 3 s.h.**Grief and Bereavement in a Diverse World (D)**

This course will provide a framework for critical analysis of the dynamics of grief and bereavement. Combining a general social systems perspective, an ecological perspective and the problem-solving approach, this course will assist students in integrating knowledge about grief and bereavement into their knowledge of practice theory and human behavior at the micro, mezzo and macro levels. Students will appreciate the diversity of grieving practices and rituals among cultural, religious and ethnic groups. Bereavement dynamics across the life span are addressed. The impact of death and disaster at the community level will be understood, including assessment tools and intervention strategies. Prereq: COMM 100, ENGL 110, 24 semester hours of gen. ed. and junior standing

SOWK 316: 3 s.h.**Mediation (G3)**

Mediation as an alternate form of dispute resolution is continuing to rise and is being used in corporate, labor, consumer and family issues widely across the United States. Students in the Mediation class will focus on practical and theoretical aspects of mediation and its place in the larger framework of alternate dispute resolution. Skills in helping parties find common ground, creating a climate for reaching agreement, aspects of confidentiality, and both directive and non-directive mediation techniques will be explored. Each student will have the opportunity to role-play at least one brief session in the role of mediator.

SOWK 322: 3 s.h.**Writing for Social Work Practice (W)**

Aiming to strengthen students' foundational and professional writing skills in preparation for professional social work practice, a combination of peer-review processes and iterative instructor feedback is utilized to support students as they produce the course's primary product—a comprehensive literature review. Students receive instruction related to foundational writing skills and complete assignments related to writing forms required of social work professionals to increase their writing competency. Prereq: SOWK 102, ENGL 110H or ENGL 110, junior standing. SOWK majors only.

SOWK 323 (405): 3 s.h.**Human Behavior and the Social Environment II**

The second of two courses in human behavior and the social environment, emphasizing 1) the interaction of social and economic forces with individuals and social systems; 2) traditional and alternative theories about systems as they interact with people, promoting and impeding health, welfare and well-being, in the context of human culture and diversity; and 3) knowledge about opportunity structures and how they promote and deter human development and meeting needs. Prereq: C or higher in SOWK 203. SOWK majors only.

SOWK 401-402: 6 s.h. each**Field Instruction I and II**

Supervised placement in social service agencies for 450 hours of social work practice. Malpractice liability insurance required. Prereq: 24 credit hours of social work professional courses. Prereq: C or higher in SOWK 403. Coreq: SOWK 431. SOWK majors only.

SOWK 403: 3 s.h.**Social Work Practice III**

Theoretical aspects of the skills, knowledge and values in social work practice at the macro level involving organizations and communities. Integration of abstract knowledge with concrete experience in the field. Prereq: C or higher in SOWK 302. SOWK majors only.

SOWK 430 (330): 3 s.h.**Social Work Research (W)**

Emphasis on the scientific method in development of beginning evaluative skills that contribute to practice competence. Knowledge to evaluate critically the research findings of others; use of research methods to improve practice. Students are required to participate in a research study. Prereq: ENGL 110, SOWK 102, SOWK 322. SOWK majors only.

SOWK 431 (331): 3 s.h.**Social Work Statistics (W)**

Social work research skills, values and knowledge. Research design, statistical usage and data analysis in social work practice and research. Students develop a research proposal. Prereq: ENGL 110, MATH 100 or Gen. Ed. MATH, SOWK 430. SOWK majors only. Coreq: SOWK 401/402.

SOWK 350: 3 s.h.**Encounters in Human Diversity (D, P)**

An upper-level, multicultural, interdisciplinary, interactive course designed to enhance students' knowledge, skills and values relative to working with people in professional situations within a diversity-embracing atmosphere. Focuses on the various differences in communication styles brought about by gender and culture. Designed for students whose anticipated careers are primarily oriented to direct work with people. Prereq: COMM 100, ENGL 110 and junior status.

SOWK 475: 3 s.h.**Special Topics in Social Work**

The course is an advanced study of a social work practice issue. The course may be taken for credit more than one semester as topics vary. Topics may include youth violence, human trafficking, poverty and homelessness, immigration and refugee care, military social work, and rural social work issues. Credit and meeting hours are variable, depending on the topic offered. Offered annually with different topics. Prereq: SOWK 102.

SOWK 498: 1-3 s.h.**Independent Study**

For further information on independent study, see the *Special Academic Opportunities* section.

SOWK 489, 499: 1-3 s.h.**Honors Courses/Thesis**

For the definition of honors courses/thesis and eligibility, refer to the *Special Academic Opportunities* section of this catalog.

SOCIOLOGY/ANTHROPOLOGY

College of Arts, Humanities and Social Sciences

Professor Glazier, chairperson

Professors Arnold, Mahaffy

Associate Professors Schmitt, Smith, Trussell

Assistant Professors Garcia, Orr, Porter, Rosenberg

The Department of Sociology/Anthropology offers both a major and minor in sociology, a major and minor in anthropology, an option in archaeology and a minor and option in criminology. Many departmental faculty teach in the women's studies, African-American studies and Latina(o) studies programs.

Anthropology Major

The departmental major in anthropology emphasizes a holistic approach to the study of humans, located in all parts of the world, through all periods of time. Anthropology consists of four separate but interrelated subdisciplines: cultural anthropology, physical anthropology, archaeology and anthropological linguistics. Our program focuses primarily on the subdisciplines of archaeology and cultural anthropology. The department encourages its majors to undertake field study in one or more of the subdisciplines of anthropology. A major in anthropology provides the student with a holistic and comparative perspective on problems and situations, which employers find very valuable. An undergraduate degree prepares the student for employment in the area of human services, entry-level work with local or federal government agencies, and employment in the business community. Our program also prepares students for more advanced study leading to careers in teaching and research at colleges, universities or museums, or research/consultative careers with local, national or international organizations.

Sociology Major

Sociology is the scientific study of human interaction and social organization. The sociologist is primarily interested in discovering the social patterns affecting and resulting from human group behavior. Sociologists focus on the influences of the social as well as the physical and biological environment on individual behavior and personality formation, on group interaction and on social organization and institutions. Within this general framework, sociological interests are extremely varied. The subject matter of sociology includes crime and its causation, family problems and interaction patterns, variations in the aging process, the impact of social class on life chances, the influence of mass media on human behavior, the social construction of gender and the transition from adolescence to adulthood. The sociology major is selected by those students primarily interested in pursuing careers in the following areas: college/university teaching and research, research in a public or private organization or business, and employment in community agencies or in local, state or federal government.

Minors and Department Options

The department offers three minors: one in criminology, one in sociology and one in anthropology. These minors provide the student with insight into the principles governing human interaction and social organization. The criminology minor is the most specific of the three, focusing exclusively on the American criminal justice system. The sociology minor, in broad terms, examines American society, while the student minoring in anthropology can focus on either archaeology or cultural anthropology. All of these minors should facilitate career advancement and intellectual breadth, regardless of the student's major field of study.

For sociology majors wishing to concentrate their studies in the areas of criminal behavior and criminal justice, the department has a criminology option within the sociology major. This program provides the student not only with a thorough knowledge of the American criminal justice system, but combines that knowledge with a broad understanding of American society and the principles of sociological method and theory.

The archaeology option within the anthropology major offers students a broad view of contemporary archaeology, with emphasis on contract archaeology, artifact analysis, current method and theory, field experience and independent research.

The department strongly encourages all of its majors to acquire practical experience as part of their degree program. This experience may take a variety of forms, depending on the student's major or minor. Along with other activities, the department recommends participating in faculty-supervised research (ongoing research projects are conducted out of both the archaeology and social research labs), cooperative education/internships (see *Cooperative Education* in the *Special Academic Opportunities* section), studying abroad for a semester or summer term, or becoming a departmental tutor.

There is an honors program for superior students. Further information may be obtained from the department or the *Departmental Honors* section of this catalog.

For the most recent curriculum and career information, students should consult the sociology/anthropology department website.

DEPARTMENTAL POLICIES

The policies for admission to the major and retention in the major apply to the B.A. sociology major and the B.A. sociology/criminology option major.

Policies for Admission to the Major

1. New freshmen must have the required SAT I scores or class rank as determined by the University administration.
2. All other students (internal and external transfers) must:
 - Complete SOCY 101 (or equivalent course) with a C or higher,
 - Complete MATH 130 (or equivalent course) with a C- or higher,
 - Obtain a minimum GPA of 2.0 and a GPA of at least 2.0 in courses required for the major. Internal transfers must have completed 15 semester hours at Millersville University.
3. Students who meet the above criteria may apply for admission to the sociology or sociology/criminology major and will be admitted if space is available.

Policies for Retention in the Major

1. University requirements for retention.
2. Majors must maintain a minimum GPA of 2.0 overall and in the major. If either GPA falls below 2.0, the student has one semester to reestablish a 2.0, after which time the student will be dismissed from the major if either GPA remains below 2.0. A student who has been dismissed may petition the department to be readmitted after she/he has satisfied the minimum retention requirements. Students will be readmitted on a space-available basis.
3. A student must earn a minimum grade of C in SOCY 101: Introduction to Sociology; a minimum grade of C- in MATH 130: Elements of Statistics; a minimum grade of C in SOCY 230: Criminology; and a minimum grade of C- in SOCY 302: Social Statistics before taking courses for which these are prerequisites. A student who does not earn the necessary grade in these prerequisite courses by the second attempt will be dismissed from the sociology or sociology/criminology major.
4. The sophomore review is a mandatory, nongraded activity designed to enhance departmental advising. It will take place after the completion of 45 semester hours but no later than the semester following the completion of 60 semester hours. If the student fails to participate in the review, she/he will be placed on probation in the major for one semester, during which time she/he will be given a final opportunity to complete the departmental academic review. Failure to complete the review during the probationary period will result in the student being dismissed from the major.

COURSE REQUIREMENTS

Anthropology Major (B.A.): 120 s.h.

Required courses: ANTH 121, 122, 123, 220, 422; 3 additional ANTH credits at the 200 level above 220; 3 ANTH credits at the 300 level; 3 additional ANTH credits at the 400 level; 6 additional s.h. in ANTH to equal 30 s.h. Required related courses: one of the following options: foreign language (6 s.h.), area option (9-12 s.h.), statistics and computer science (9-11 s.h.) or a minor.

Anthropology Major/Archaeology Option (B.A.): 120 s.h.

Required courses: ANTH 121, 122, 123, 220, 233, 320, 422 and 425 and 6 s.h. at the 200 level or above (excluding ANTH 201).

Sociology Major (B.A.): 120 s.h.

Required courses: SOCY 101, 301, 302, 303, 305 and 15 s.h. of electives in sociology, including 3 s.h. at the 300 level or above. Required related courses: MATH 130 with a minimum grade of C- (Prereq for SOCY 302) and 12-18 credits of nonsociology courses.

Sociology Major/Criminology Option (B.A.): 120 s.h.

Required courses: SOCY 101, 230, 301, 302, 303, 305, 331, 332 and 3 s.h. of SOCY 334-339 and 3 s.h. of electives in sociology. Required related courses: MATH 130 with a minimum grade of C- (Prereq for SOCY 302) and 9 s.h. of related criminology electives.

Social Studies Major (B.S.Ed.): 120 s.h.**Secondary Education Certificate**

There is currently no separate program to prepare students to teach anthropology or sociology in the secondary schools. Students interested in pursuing teaching of anthropology or sociology should consult the *Social Studies* section of this catalog to learn how to fulfill their career goals.

Sociology-Psychology Double Major (B.A.): 120 s.h.

One course from PSYC 227, 228, 317, 335; SOCY 316, 319; or ANTH 342 may be credited toward both majors.

Anthropology Minor: 18 s.h.

General Anthropology Option: ANTH 201, 220, 422 and 3 s.h. at the 300 level or higher and 6 additional s.h. in anthropology.

Archaeology Option: ANTH 121, 123, 320, 425 (6 s.h.) and 3 additional s.h. of anthropology.

Cultural Anthropology Option: ANTH 121, 220, 422 or 458, 3 s.h. at the 300 level and 6 additional s.h. in anthropology.

Sociology Minor: 18 s.h.

Required courses: SOCY 101, 3 s.h. at the 200 level and 12 additional s.h. of sociology at the 300 or 400 level.

Criminology Minor: 18 s.h.

Required courses: SOCY 101, 230, 331 and 332, plus 6 s.h. from SOCY 334-339 and/or 3 s.h. of sociology co-op/internship.

COURSE DESCRIPTIONS*Sociology***SOCY 101: 3 s.h.****Introduction to Sociology (G3)**

Introduction to the scientific study of human groups, organizations and societies. Examination of major sociological questions and approaches to studying them.

SOCY 148: 1 s.h.**Major Orientation Course**

Introduction to the social sciences of anthropology and sociology, department faculty, and opportunities for study and participation. Offered infrequently.

SOCY 210: 3 s.h.**Sociology of the Family (G3)**

The family as a social institution. Topics include the family in mass society, diverse family forms, human sexuality, typologies of love, mate selection, husband-wife interaction, parent-child interaction, family disorganization and American ethnic families. Specific topics may vary.

SOCY 211: 3 s.h.**Social Problems (G3, W)**

A sociological examination of problem areas or human concerns such as poverty, labor issues, substance abuse, domestic violence, crime and justice, health, the environment, discrimination and globalization. Topics may vary. Prereq: ENGL 110.

SOCY 216: 3 s.h.**Human Population (G3)**

Analysis of population processes such as fertility, mortality, composition, distribution and migration patterns; relationship of population processes to social, economic and political development; effects of status differences; trends in population change. Offered periodically.

SOCY 230: 3 s.h.**Criminology (G3, W)**

The nature and causes of criminal behavior and the types of social response to law violation. Offered fall, spring. Prereq: SOCY 101, ENGL 110.

SOCY 301: 3 s.h.**Craft of Sociology (W)**

Exploration of the technical and analytical skills of sociology, including locating sociological resources, citing sociological materials, writing literature reviews and understanding links between sociological knowledge and public policy. Prerequisites: SOCY 101, ENGL 110.

SOCY 302: 4 s.h.**Social Statistics**

Emphasis on learning and presenting findings from applied statistical techniques, including frequency tables and graphs, contingency tables, measures of central tendency and dispersion, hypothesis testing, confidence intervals, analysis of variance, correlation, and linear regression (bivariate and multiple). SPSS software package used. Offered fall, spring. Prereq: C- or higher in MATH 130 and 9 s.h. in sociology/anthropology.

SOCY 303: 3 s.h.**Sociological Theory**

Examination of classical and contemporary theoretical traditions; relevance of sociology to everyday life; works of selected theorists such as Durkheim, Marx, Weber, Merton. Offered fall, spring. Prereq: SOCY 101 and 9 s.h. of sociology at the 200 level or higher.

SOCY 305: 3 s.h.**Social Research Methods (W)**

Overview of major research methods: survey analysis, interviewing, participant observation, content analysis and experimental design. Each student designs and completes a research project. Offered fall, spring. Prereq: ENGL 110, SOCY 101 or 211, SOCY 303 and C- or higher in SOCY 302.

SOCY 307: 3 s.h.**African-American Social Thought (G3)**

Examination of the development of African-American social theory through the history of the American republic. Looks at the relationship between African-American social thought, civil rights movements and the larger Afro-Caribbean diaspora. Offered infrequently. Prereq: 9 s.h. in African-American Studies or SOCY 101 and 9 s.h. in sociology (SOCY 303 recommended) or permission of instructor.

SOCY 308: 3 s.h. (D)**Sociology of African-American and Latina(o) Education**

Social and historical analysis of the secondary and postsecondary experiences of African-American and Latina(o) youth in the United States. Informed by critical race, feminist and stratification theories. Offered periodically. Prereq: SOCY 101 or LATS 201.

SOCY 313: 3 s.h.**Sociology of Disaster (G3)**

Behavioral and organizational response to environmental hazards and disasters. Case studies of major natural disasters and hazardous-materials incidents illustrate individual, group and societal challenges faced in such events. Issues include building a disaster-resistant community, the impact of the media, and governmental successes and failures. Offered annually. Prereq: SOCY 101 or SOCY 211. A required course for the EHEM minor.

SOCY 315: 3 s.h.**Race and Ethnic Relations (G3)**

Study of racial and ethnic relations, modes of adaptation of minorities and cross-cultural examinations of dominant-minority relations. Offered periodically. Prereq: 3 s.h. of sociology or junior/senior status.

SOCY 316: 3 s.h.**Social Psychology (G3, W)**

Introduction to sociological social psychology; how social interactions are created, become patterned and are susceptible to change; how society is structured through social interaction; and how social identities are formed. Specific topics may vary. Offered periodically. Prereq: ENGL 110, 3 s.h. of sociology or junior/senior status.

SOCY 317: 3 s.h.**Sociology of Health (G3)**

Social and cultural factors in health and illness; social organization of the medical care system; structural and interactional aspects of healthcare. Prereq: 3 s.h. sociology or junior/senior status. Offered periodically.

SOCY 318: 3 s.h.**Sociology of Complex Organizations**

Social-interaction processes in business and industry; nature and effects of complex industrial organization; interrelationships among industry and other social subsystems. Offered periodically. Prereq: 3 s.h. sociology or junior/senior status.

SOCY 319: 3 s.h.**Social Stratification (G3)**

The development of social inequality by race, ethnicity, class, gender and nationality. The social construction of race and gender; various theories of class distribution. Inequality in education, housing and the workplace is discussed. Global instances of inequalities are also discussed. Offered periodically. Prereq: 3 s.h. of sociology and junior/senior status.

SOCY 320: 3 s.h.**Sociology of Education (G3)**

Analysis of education as a social institution and its relationship to other institutions; the roles of educator, administrator, student and parent; implications of subcultures, social stratification and social change. Offered infrequently.

SOCY 329: 1-6 s.h.**Topics in Sociology**

Offered periodically.

SOCY 331: 3 s.h.**Sociology of Policing and the Courts (G3)**

Overview of the American system for the administration of justice focused on the apprehension, prosecution and adjudication of criminal defendants. Prereq: SOCY 101, 230.

SOCY 332: 3 s.h.**Modern Corrections (G3)**

Contemporary American responses to crime. Concentrates on the origins, nature, functions and limitations of American correctional modalities. Prereq: SOCY 101, 230.

SOCY 334: 3 s.h.**Juvenile Delinquency (G3)**

Nature and extent of juvenile crime; theories of causation; techniques of control and prevention. Offered annually. Prereq: SOCY 101, 230.

SOCY 338: 3 s.h.**Sociology of Deviance**

Deviance as a social phenomenon. Discusses how definitions of deviance have changed over time, how people become labeled “deviant” and the utility of various theories of deviance. Offered annually. Prereq: SOCY 101.

SOCY 339: 3 s.h.**Topics in Criminology**

The nature, extent, origins and possible “solutions” to select problems in contemporary criminology. Offered periodically. Prereq: SOCY 101 and 230 or permission of instructor.

SOCY 441: 3 s.h.**Urban Society**

Historical and postmodern analysis of urban development, in particular the impact of demographic, political and socioeconomic structural changes on the social fabric of U.S. metropolitan cities. Topics include inner-city life and culture, race, gender, class relations and policy implications. Offered periodically. Prereq: SOCY 101.

SOCY 448: 3 s.h.**Seminar in Sociology**

Research and group discussion for advanced students on various topics of interest. A total of 6 s.h. may be taken. Offered periodically. Prereq: permission of instructor.

SOCY 489, 499: 1-4 s.h.**Departmental Honors in Sociology**

Two to four semesters of supervised research through independent projects. Prereq: 3.0 GPA and recommendation by a faculty mentor. For further information, see the *Special Academic Opportunities* section.

SOCY 498: 1-6 s.h.**Independent Study in Sociology**

For further information, see the *Special Academic Opportunities* section. Prereq: 3.0 GPA and permission of faculty member.

SOCY 586: 3-6 s.h.**Topics in Sociology**

Offered periodically.

*Anthropology***ANTH 121: 3 s.h.****Cultural Anthropology (G3)**

Introduces basic concepts and topics: culture, fieldwork, communication, sex roles, social organization, politics, economics, belief systems, culture change and applied anthropology.

ANTH 122: 3 s.h.**Physical Anthropology (G3)**

The anthropological study of human evolution: paleoanthropology, primatology and human population genetics, and the study of human variation—the ways humans adapt biologically to their environments. Offered annually.

ANTH 123: 3 s.h.**Introduction to Archaeology (G3)**

Introduces methods and theory of contemporary archaeology using examples from Old and New World prehistory. The relationship of archaeology to anthropology is emphasized. Offered annually.

ANTH 148: 1 s.h.**Major Orientation Course**

Introduction to the social sciences of anthropology and sociology, our department faculty and opportunities for study and active participation. Offered infrequently.

ANTH 201: 3 s.h.**People, Primates and Prehistory (G3)**

A general introduction to the four subdisciplines within anthropology: biological anthropology, archaeology, cultural anthropology and anthropological linguistics—taking an evolutionary and comparative perspective of the human condition. Offered infrequently.

ANTH 220: 3 s.h.**Ethnographic Methods (W)**

Introduces ethnographic research methods through individual or group fieldwork, emphasizing the ethnographic interview and participant observation. Prereq: ENGL 110 and permission of instructor.

ANTH 222: 3 s.h.**North American Indians (G3, W)**

Examination of past and present cultures of the native peoples of North America. Offered periodically. Prereq: ENGL 110.

ANTH 223: 3 s.h.**Peoples and Cultures of the Mediterranean (G3)**

Comparison and contrast of the history and culture of rural and urban society in the Mediterranean region. Focus is on topics and themes of importance to the circum-Mediterranean culture area. Offered periodically.

ANTH 226: 3 s.h.**Comparative Societies (G3, W)**

Comparative investigations of a topic or region of current interest in the field of anthropology. Offered annually. Prereq: ENGL 110.

ANTH 227: 3 s.h.**Culture Through Film (G3, W)**

Comparative study of cultures through the medium of film, using anthropological theories, perspectives and texts. Offered annually. Prereq: ENGL 110.

ANTH 233: 3 s.h.**Topics in Archaeology (G3)**

Examines human cultural evolution before and after the advent of writing, using archaeological and related records. Topics vary, from the rise of civilization to the decline of local communities. Offered annually.

ANTH 235: 3 s.h.**Historical Archaeology (G3)**

A comparative study of methods and aims in the discipline of historical archaeology (the excavation of sites dating post-1500), including excavation and analysis techniques, approaches to archaeological research, and case studies of specific excavations.

ANTH 320: 3 s.h.**Archaeological Method and Theory**

Focus on current developments in archaeological method and theory, with specific emphasis on contract archaeology, survey methods, artifact analysis and contemporary theoretical approaches. Offered annually. Prereq: ANTH 123 plus 3 additional hours of anthropology or permission of instructor.

ANTH 325: 3 s.h.**Medical Anthropology**

Cross-cultural study of health and healing, including comparative medical systems, theories of disease, patients/healers in the context of culture, mental health, bioethics, interaction of culture, biology and environment, and the effects of cultural change. Offered periodically.

ANTH 342: 3 s.h.**World Hunger (P)**

Cross-cultural and interdisciplinary study of famine and world hunger. Critical examination of the political, economic and ecological causes of famine and the psychological and social effects of starvation. Offered infrequently. Prereq: COMM 100, ENGL 110 and junior status.

ANTH 344: 3 s.h.**Gender, Race and Class (P)**

The intersecting role of gender, race and class on human social life in the United States. and in other cultures. An interdisciplinary and comparative examination of the ways social categories define, limit and liberate human potential. Offered annually. Prereq: COMM 100, ENGL 110, junior status and at least two social science courses.

ANTH 422: 3 s.h.**History of Anthropological Theory**

Examines, in a developmental fashion, the attempts made by anthropologists to explain human similarities and differences, and the dynamics of culture change. Offered annually. Prereq: junior/senior status and a minimum of 9 s.h. in anthropology.

ANTH 425: 1-6 s.h.**Field/Research Experience in Anthropology**

Individual or group research in any of the subdisciplines of anthropology, including archaeological field school and ethnographic field projects. Offered periodically. Prereq: permission of instructor.

ANTH 458: 3-6 s.h.**Senior Seminar in Anthropology**

Research and group discussions for advanced students on various topics of interest. A total of 6 s.h. may be taken. Offered in alternate years. Prereq: permission of instructor.

ANTH 489, 499: 1-4 s.h.**Departmental Honors in Anthropology**

Two to four semesters of supervised research by highly motivated students capable of conducting independent research projects. Prereq: 3.0 GPA and recommendation by faculty mentor. For further information, see the *Special Academic Opportunities* section.

ANTH 498: 1-6 s.h.**Independent Study in Anthropology**

For further information, see the *Special Academic Opportunities* section.

SPANISH

See Foreign Languages

STATISTICS

See Mathematics

TECHNOLOGY & ENGINEERING EDUCATION

See Applied Engineering, Safety & Technology

THEATRE

See Communication & Theatre

UNIV 103

See Freshman Year Inquiry

WELLNESS & SPORT SCIENCES

College of Education and Human Services

Professor Keefer, chairperson

Professors Mowrey, Wushanley

Associate Professors Audette, Halawa, Lombardi, Nesbitt, Wimer

Assistant Professors Dupain, Schaeffer

WSSD Mission: The Wellness & Sport Sciences department is committed to improving the personal and professional lives of Millersville University students as well as citizens from the surrounding region through teaching, continued scholarly growth and service.

The fivefold mission for WSSD is to provide wellness education to every undergraduate student; to provide sport management education for students in the M.Ed. in Sport Management degree; to provide athletic coaching education to undergraduate students in the athletic coaching minor; to provide clinical education and administrative oversight for the dual-degree program in athletic training and biology; and to provide a pedagogical foundation in wellness and physical education for education majors.

The department focuses primarily on the undergraduate teaching of wellness, which is required for graduation of all Millersville University students. The department assists in the coordination of a dual-degree program in biology at Millersville University, and athletic training at West Chester University. Please also refer to the B.S. Biology, Pre-Athletic Training Option description in the biology section of this catalog for course requirements and further information. In addition, the department offers a minor in athletic coaching for those wishing to develop the knowledge and skills necessary to safely coach athletes. Students are eligible to receive certification in the American Sport Education Program. Further, the department offers an elective course which grants national certification in first aid and an elementary physical education class. The department also offers a graduate program with a master's degree in sport management, with a concentration in athletic management and athletic coaching.

Students are required to pass three credits in wellness to qualify for degrees. Only WELL 175: Wellness: Concepts of Health and Fitness or WELL 240: Health, Safety and Nutrition for the Developing Child may be used to satisfy the general education, connections and exploration requirement.

Biology Major (B.S.): 149 s.h.

Pre-Athletic Training Option

A dual-degree program is offered through Millersville University and West Chester University. Millersville University students who wish to obtain a degree in biology/pre-athletic training will simultaneously complete the athletic training degree requirements at West Chester University. Students will meet the general education, biology and pre-athletic training requirements at Millersville. Athletic training credits will be earned via distance-learning technologies and one summer of mandatory courses at West Chester. Upon completion, students will earn two bachelor's degrees from two universities in four years. For more information, please also refer to the B.S., Biology, Pre-Athletic Training Option description in the Wellness & Sport Sciences section of this catalog.

COURSE REQUIREMENTS

Allied Health Technology Major (B.S.): 148 s.h.

Pre-Athletic Training Option

BIOL 100, 254, 255, 257, 352, 362, 364, 454, 461. Electives to bring total biology credits to 29. MATH 130, 160; 16 s.h. chemistry; 4 s.h. physics; 18 s.h. Wellness & Sport Sciences (WSSD) and 38 athletic training credits earned via distance-learning technologies and one summer of mandatory coursework at West Chester University. Dual-degree program with West Chester University. See the curriculum sheet for appropriate courses.

Biology Major (B.S.): 149 s.h.

Pre-Athletic Training Option

BIOL 101, 211, 254, 255, 352, 362 and 375. 16 s.h. chemistry, 8 s.h. physics, 4 s.h. mathematics (MATH 161), 54 s.h. Millersville University–West Chester University athletic training credits earned via distance learning and one summer of mandatory coursework at West Chester University. Dual-degree program with West Chester University. See the curriculum sheet for appropriate courses.

Minor in Athletic Coaching: 18 s.h.

The minor in athletic coaching provides students with the theory and practical experiences to enable them to coach athletics in elementary, high school and collegiate levels, as well as youth sports programs. The minor requires completion of 18 credits. To provide undergraduates in the minor with opportunities to further their professional growth and development, the minor in athletic coaching will lead to opportunities for certification through the American Sport Education Program (ASEP) in Coaching Principles.

COURSE REQUIREMENTS

Required Core: 12 s.h.

WSSD 311: 3 s.h.

First Aid & CPR

WSSD 450: 3 s.h.

Kinesiological & Physiological Foundations of Coaching

WSSD 480: 3 s.h.

Theory & Techniques of Coaching

WSSD 483: 3 s.h.

Medical-Legal Aspects of Coaching

Block 1: Coaching-Related Courses. Choose one of the following: 3 s.h.

WSSD 482: 3 s.h.

Coaching Effectiveness

WSSD 484: 3 s.h.

Psychosocial Foundations of Coaching

WSSD 485: 3 s.h.

Performance Enhancement: Mental Training in Sports

WSSD 551: 3 s.h.

Coaching of Sport

WSSD 582: 3 s.h.

Sport Psychology

Block 2 Electives: 3 s.h.

WSSD 350: 3 s.h.

Sport in America

WSSD 452: 3 s.h.

Nutrition for Performance Enhancement

WSSD 454: 3 s.h.

Leadership Development in Sports

WSSD 485: 3 s.h.

Performance Enhancement: Mental Training in Sports

WSSD 591: 3 s.h.

Exercise Physiology

*A topics course can be taken multiple times for credit, but no topic may be repeated.

COURSE DESCRIPTIONS

The following courses satisfy the wellness part of the general education connections and exploration requirements:

WELL 175: 3 s.h.

Wellness: Concepts of Health and Fitness

This course offers a comprehensive discussion of the dimensions of wellness, including such topics as physical fitness, nutrition, psychological well-being, time and stress management, STI prevention, sexual violence risk reduction, active bystander interventions, addictive behaviors related to alcohol and other drugs, as well as chronic diseases. The course also includes useful and practical advice for adopting a wellness lifestyle that takes into account individual interests, goals and life situations.

WELL 240: 3 s.h.

**Health, Safety and Nutrition for the Developing Child
(For Education Majors Only)**

This course is designed to address the essential components of children's wellness. The course will present ways to promote children's health through awareness, effective practices and knowledge of health issues; address the creation and maintenance of safe environments for young children; and meet children's essential nutritional needs through nutrition education and planning. Emphasis will be placed on preventive health practices, the promotion of lifelong physical activity, and on the collaborative effort of families and teachers in the promotion of these wellness issues in the face of current health issues for children, especially obesity. Offered fall, spring.

ELECTIVES

WSSD 310: 3 s.h.

Physical Education for the Elementary School

Methods, materials, facilities and equipment for programs of health and physical education in elementary schools. Opportunities for observation of children at play, making equipment, program planning and teaching. Offered fall, spring.

WSSD 311: 3 s.h.

Standard First Aid and CPR

Preparation of students to develop skill and knowledge enabling them to administer first aid in the case of an accident or sudden illness. Certification in CPR and standard first aid according to American Red Cross standards.

WSSD 350: 3 s.h.

Sport in America (W)

Examines selected major issues in American sport. Emphasis on developing a historical perspective of the origins and implications of recent developments in modern sport. Study of various issues that have influenced the development of sport-religion, economy, education, race, gender, social class and politics, and explanation of ways sport has contributed to shaping the larger culture. Offered fall, spring. Prereq: ENGL 110.

WSSD 390: 4 s.h.

Athletic Training Techniques and Surface Anatomy

This course introduces students to the fundamental principles and basic techniques used by Certified Athletic Trainers (ATCs). Topics will include appropriate taping, wrapping and bracing procedures commonly prescribed for athletic injuries; selected therapeutic modalities; and an understanding of basic anatomy and functions of the musculoskeletal system, including an orientation to the major anatomical landmarks and underlying body structures. Pre-Athletic Training majors only. Offered summer.

WSSD 395: 3 s.h.

Leisure Activities for the Aged

WSSD 450: 3 s.h.

Kinesiological and Physiological Foundation of Sport

The study of movement, specifically dealing with movement of the human body, including mechanics, laws of motion, anatomy and the detailed analysis of coaching activities. The functions of the various systems of the human body under stress of muscular activity that are basic for the development and maintenance of physical fitness and sport. Offered annually.

WSSD 452: 3 s.h.

Nutrition for Performance Enhancement

This course will provide a comprehensive overview of the nutritional needs of athletes and how proper nutrition may lead to better overall personal health and performance.

WSSD 454: 3 s.h.

Leadership Development in Sports

This course is designed for students involved in the athletic coaching minor program as well as any student who wants to learn more about leadership in sports. To be a successful coach, it is essential to understand key leadership concepts such as motivation, integrity, team building and influencing people. The program content of this class will reflect these key leadership issues as well as other areas like vision, problem solving, building effective relationships, group dynamics and diversity. In addition, all participants will complete a "Leadership Project." The "Leadership Project" will be a well-conceived vision and plan for action for the participants to implement upon completion of the class.

WSSD 480: 3 s.h.

Theory and Techniques of Coaching and Sport

Theory and techniques of the function, organization and administration of athletics in the total education program. Certification in Coaching Principles and Sport First Aid is available through the American Sport Education Program. Offered annually.

WSSD 482: 3 s.h.

Coaching Effectiveness

Course introduces students to the fundamental principles and basic techniques used by athletic coaches. Topics include skill acquisition, competitive sport strategies, practice planning and game tactics to assist athletic coaches in designing successful athletic programs.

WSSD 483: 3 s.h.

Legal Aspects of Sport

Instruction in prevention, treatment and care of athletic injuries. Legal and moral responsibilities in supervising elementary and secondary student-athletes are discussed. Certification in sport law is available through the American Sport Education Program. Offered fall, spring.

WSSD 484: 3 s.h.

Psychosocial Foundations of Sport

The psychosocial factors affecting human behavior in modern society as applied to coaching situations and the historical development of sports programs. Offered periodically.

WSSD 485: 3 s.h.

Performance Enhancement: Mental Training in Sport

This course will help students understand how psychological factors affect an individual's physical performance and understand how participation in sport and exercise affects a person's psychological development, health and well-being. By the end of this course, students will view sport and physical activity as agents for personal and social change. Offered periodically. Prereq: PSYC 100 for the B.S. BIOL/PATHL; WSSD 480 for athletic coaching minor.

WSSD 486: 3 s.h.

Topics

WSSD 551: 3 s.h.

Coaching of Sport

WSSD 582: 3 s.h.

Sport Psychology

WSSD 591: 3 s.h.

Exercise Physiology

WOMEN'S STUDIES

Assistant Professor Bagchi, director

Women's Studies is an 18-credit interdisciplinary minor that involves courses in a wide array of traditional fields, including history, anthropology, communication, business, health, education and literature. The goal of the minor is to inform students about women's contributions, perspectives and visions in our own and other cultures; to validate women's experiences; and to challenge the economic, political and social devaluation of women. Students electing the minor must take Introduction to Women's Studies (WSTU 220) and Feminist Theory (WSTU 330) as well as WSTU 345 (Feminist Research Methods in WSTU) or WSTU 488 (Senior Seminar) and three other electives from an approved list. The minor complements many majors and can be completed as students fulfill general education requirements. Students taking courses in women's studies will benefit by having a more complete education, a greater appreciation for women's contributions, a greater sense of life options for women and a fuller understanding of gender and its role in human life. Expertise in women's studies will help students successfully handle gender-based power dynamics in all professions as well as prepare them for jobs in women-centered areas of health, social work, education, psychology, journalism, politics, public administration and business.

Women's Studies Minor: 18 s.h.

Required courses: WSTU 220, 330 and 345 or 488, plus three courses to be selected from the list of approved courses, at least one of which must be at the 300 level or above. Students will pick courses to satisfy the electives after consultation with their women's studies advisor.

COURSE DESCRIPTIONS

WSTU 220: 3 s.h.

Introduction to Women's Studies (G3)

Interdisciplinary and multicultural study of women's roles and relationships and the ways they differ among women by race, ethnicity, class and sexual orientation. Overview of theoretical perspectives on gender and examination of contemporary issues facing women.

WSTU 330: 3 s.h.

Feminist Theory (P)

This course explores diverse strains of feminist theory, including liberal, radical, black, global, socialist/Marxist and lesbian feminisms. This is a required course for all women's studies minors. Prereq: COMM 110, ENGL 110, WSTU 220, junior status or instructor permission.

WSTU 345: 3 s.h.

Feminist Research Methods in Women's Studies (G3)

This course introduces qualitative and quantitative research methods relevant to women's studies. This course is one option for fulfilling minor requirements. Prereq: WSTU 220 or instructor permission.

WSTU 391: 3 s.h.

Women in Mathematics and Science (D, P)

Explores the lives and discoveries of women scientists and the impact they have had on science and society through the centuries. Focus is on science/mathematics content as relevant to these scientists. Three disciplines will be represented in each class section. Prereq: ENGL 110, COMM 100, 100-level MATH course and one 100-level course in science; junior status. Course cross-listed with SCMA 391. Offered every spring.

WSTU 488: 3 s.h.

Women's Studies Senior Seminar (G3, W)

Interdisciplinary and multicultural examination of how feminist perspectives and a focus on women can restructure social institutions, ways of thinking and academic disciplines. Prereq: ENGL 110, junior or senior status, and WSTU 220 or another approved women's studies course or permission of instructor.

WSTU 491: 1-4 s.h.

Topics in Women's Studies

Investigates topics related to women's studies in history, literature, music, art, anthropology, sociology, communications, business, science or other field.

WSTU 498: 1-6 s.h.

Independent Study

Allows students to pursue an academic area of interest not available through an established course, with faculty supervision and guidance. For further information, see the *Special Academic Opportunities* section of the catalog, and consult with the director of women's studies.

APPROVED WOMEN'S STUDIES COURSES

Descriptions of these courses may be found under the appropriate departmental listing.

ANTH 322

Food and Culture (G3, W)

ANTH 344

Gender, Race and Class (P)

BUAD 405

Topics: Gender and Diversity

COMM 330

Media and Women's Culture (P)

COMM 333

Gender and Communication (D)

ECON 327

Women and Global Economic Development (P)

EDFN 312

Women and Education: Socialization and Liberation (P)

EDFN 376

Whose School Is It, Anyway? (D, P)

EDUC 433

Gender and Race Issues in Children's Literature (P)

ENGL 331

Topics: American Women Writers

ENGL 337

Women Writers in the Middle Ages (P)

ENGL 416

The Woman Writer and Her World (G1)

ENGL 429

Seminar: Black Women Writers

ENGL 435

Journalism through Women's Perspectives

GOVT 408

Seminar: Women in Global Politics

HIST 210

Women in Western Civilization (G3, W)

HIST 250

Women in American History (G3, W)

NURS 316

Women, Health and Healthcare (P)

PHIL 391

Gender, Utopia and Human Behavior (P)

SOCY 329

Topics: Feminist Theory

SOCY 339

Topics: Gender and the Law

SOWK 312

Social Work and Women's Issues (G3, W)

SOWK 313

Family Violence (P)

SSCI 212

The Black Woman (G3)



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- Nakhai, Behnam** (1987). B.S., Tehran College of Insurance (Iran), 1975; M.B.A., Northrop University, 1976; M.A., Claremont Graduate University, 1978; Ph.D., *Ibid.*, 1982. Professor of Management & Marketing
- Nell, Marcia** (2006). B.S., University of Akron, 1979; M.Ed., University of South Florida, 1989. Associate Professor of Early, Middle & Exceptional Education
- Nesbitt, Gordon M.** (1997). B.S., University of Manitoba (Canada), 1983; M.S., University of Illinois, 1985; Ph.D., Purdue University, 1993. Associate Professor of Wellness & Sport Sciences; Director of Campus Recreation and Intramurals
- Neuville, Thomas J.** (1999). B.S.W., University of Wisconsin, 1974; M.B.A., University of Phoenix, 1987; Ph.D., Colorado State University, 2000. Associate Professor of Educational Foundations
- Nimmrichter, Susanne** (1999). M.A., University of Arizona, 1981; Ph.D., University of Pennsylvania, 1997. Associate Professor of Foreign Languages (German); Chairperson, Department of Foreign Languages
- Nolan, Michael J.** (1984). B.S., University of Illinois, 1971; M.S., *Ibid.*, 1974; Ph.D., University of Chicago, 1978. Professor of Physics; Chairperson, Department of Physics
- Ogutu, Jack** (2013). B.S., University of Nairobi, Kenya, 2004; M.S., Auburn University, 2011; Ph.D., *Ibid.*, 2013. Assistant Professor of Applied Engineering, Safety & Technology
- Onek, Curthberth** (2009). B.A., Makerere University (Uganda), 1985; M.A., University of Toronto (Canada), 1991; M.S., York University (Toronto), 1997; M.A., The Royal Military College of Canada, 2005. Assistant Professor of History
- O'Neill, Daniel F.** (2001). B.A., Haverford College, 1978; Psy.D., Hahnemann University, 1986. Professor of Counseling & Human Development
- Ording, Dominic** (2009). B.A., Michigan State University, 1985; M.A., *Ibid.*, 1989; M.A., *Ibid.*, 1997; Ph.D., *Ibid.*, 2003. Assistant Professor of English
- Orr, Ryan** (2009). B.G.S., University of Kansas, 2001; M.A., DePaul University, 2004; Ph.D., Iowa State University, 2009. Assistant Professor of Sociology/Anthropology
- Owen, David** (2013). B.S., University of Maryland, 1997; M.S., Troy University, 1998; M.S., *Ibid.*, 2005; Ph.D., Southern Illinois University, 2011. Assistant Professor of Government & Political Affairs
- Painter, Donna** (2009). B.S., California University of Pennsylvania, 1988; M.Ed., Seton Hall University, 2005. Assistant Professor of Applied Engineering, Safety & Technology
- Pannifino, James** (2008). B.F.A., Kutztown University, 1998; M.F.A., Rochester Institute of Technology, 2004. Associate Professor of Art & Design
- Parrish, Marilyn M.** (2004). B.A., Pennsylvania State University, 1978; M.A., University of Michigan, 1980; M.A., Pennsylvania State University, 1983; D.Ed., *Ibid.*, 2004. Associate Professor of Library; Chairperson, Department of Library
- Pashkova-Balkenhol, Tatiana** (2014). B.A., Udmurt State University (Russia) 1997; M.A., Emporia State University, 2002; M.L.S., *Ibid.*, 2003. Assistant Professor of Library
- Petula, Jason** (2013). B.S., The Pennsylvania State University, 1995; M.Ed., Temple University, 1999; M.S., Wilkes University, 2001; Ph.D., The Pennsylvania State University, 2007. Assistant Professor of Early, Middle & Exceptional Education
- Piperberg, Joel B.** (1989). B.A., University of Pennsylvania, 1972; Ph.D., *Ibid.*, 1977. Professor of Biology
- Porter, Aaron** (2005). B.A., Bloomsburg University, 1985; M.A., University of Pennsylvania, 1987; Ph.D., *Ibid.*, 1993. Assistant Professor of Sociology
- Powers, Elizabeth** (2014). B.S., Bloomsburg University of Pennsylvania, 1989; M.Ed., *Ibid.*, 1993; M.Ed., Antioch New England University, 1997; Ph.D., University of North Carolina, 2007. Assistant Professor of Early, Middle & Exceptional Education
- Primus, Nakeiha** (2014). B.A., Tufts University, 2005; M.A., Duke University, 2008. Assistant Professor of Educational Foundations
- Proctor, Curtis** (2014). B.A., University of Oklahoma, 1989; M.S.W., University of Iowa, 1992; Ph.D., Case Western Reserve University, 2005. Assistant Professor of Social Work
- Rajaseelan, Edward** (1990). B.S., University of Peradeniya (Sri Lanka), 1981; Ph.D., University of Arizona, 1989. Professor of Chemistry; Chairperson, Department of Chemistry
- Rice, Karen M.** (2011). B.A., Millersville University, 1991; M.S.W., Temple University, 2000; Ph.D., University of Maryland, 2011. Associate Professor of Social Work; Chairperson, Department of Social Work
- Rickard, Lyman H.** (1990). B.S., University of Southern Mississippi, 1973; M.S., *Ibid.*, 1975; Ph.D., Florida Institute of Technology, 1985. Professor of Chemistry
- Rineer, Carla M.** (2006). B.A., Mansfield University; M.A., Millersville University; Ph.D., Temple University. Assistant Professor of English
- Rivera-Hernández, Norma A.** (1998). B.A., Universidad de Puerto Rico, 1975; M.A., *Ibid.*, 1984; Ph.D., University of Texas at Austin, 1994. Associate Professor of Foreign Languages (Spanish)
- Robinson, Kevin S.** (2007). B.A., Messiah College, 1993; M.S., University of Florida, 1995; Ph.D., *Ibid.*, 2000. Assistant Professor of Mathematics
- Robinson-Lawrence, Jeri Lynn** (1992). B.F.A., SUNY at Purchase, 1986; M.F.A., The School of the Art Institute of Chicago, 1988. Professor of Art & Design
- Rosenthal, Melinda M.** (1990). B.A., San Francisco State University, 1971; M.A., State University of New York, 1981; Ph.D., University of California-Riverside, 1989. Assistant Professor of English
- Rush, Karena S.** (2004). A.B., Bryn Mawr College, 1991; Ed.M., Harvard University, 1994; M.A., Louisiana State University, 1997; Ph.D., *Ibid.*, 2000. Associate Professor of Psychology

- Russell-Loretz, Theresa A.** (1993). B.A., Marymount College of Kansas, 1979; M.S., Kansas State University, 1984; Ph.D., Purdue University, 1995. Associate Professor of Communication & Theatre; Chairperson, Department of Communication & Theatre
- Santamaria, Michele** (2015). B.A., Emory University, 1997; M. Litt., University of St. Andrews (Scotland), 1998; M.F.A., University of Oregon, 2000; M.S., Long Island University, 2005. Assistant Professor of Library
- Saunders, Kendra J.** (2002). B.S., University of Illinois-Champaign, 1996; M.A., Texas Tech University, 1999; Ph.D., Ibid., 2002. Professor, Counseling & Human Development
- Schaeffer, Stratton (Chip) Jr.** (2000). B.S., West Chester University, 1984; M.Ed., University of Texas-El Paso, 1991; Ph.D., Texas A&M University, 1998. Assistant Professor of Wellness & Sport Sciences
- Schiza, Maria V.** (2005). B.S., Roosevelt University, 1995; Ph.D., University of South Carolina, 2001. Associate Professor of Chemistry
- Schmitt, Frederika** (1998). B.A., Bucknell University, 1990; M.A., University of Delaware, 1994; Ph.D., Ibid., 1998. Associate Professor of Sociology
- Schreiber, Kathleen V.** (1994). B.A., University of Delaware, 1983; M.S., Ibid., 1990; Ph.D., Ibid., 1996. Professor of Geography
- Schreiber, Lisa M.** (2007). B.A., Truman State University, 1989; M.A., University of Oklahoma, 1991; Ph.D., University of Nebraska, 2002. Associate Professor of Communication & Theatre
- Schuller, Brant D.** (1998). B.F.A., Cleveland Institute of Art, 1990; M.F.A., Pennsylvania State University, 1992. Associate Professor of Art & Design
- Schultz, Delray J.** (1992). B.S., Moravian College, 1977; M.A., Pennsylvania State University, 1980; Ph.D., Temple University, 1992. Professor of Mathematics; Chairperson, Department of Mathematics
- Schwartz, Stephanie M.** (2002). B.S., Shippensburg University, 1991; M.S., University of Delaware, 1993; Ph.D., Ibid., 2006. Professor of Computer Science
- Sciarretta, Joseph A. Jr.** (1987). B.A., West Chester University, 1976; M.A., Ibid., 1986. Assistant Professor, Academic Student Development; AIM for Success Counselor/Coordinator; Chairperson, Department of Academic and Student Development
- Seigworth, Gregory J.** (1993). B.S., Clarion University, 1982; M.A., Ohio University, 1987; Ph.D., University of Illinois, 1998. Professor of Communication & Theatre
- Shanahan, Derek P.** (1994). B.Sc., University of London, 1984; M.A., University of Minnesota, 1987; Ph.D., Ibid., 1992. Professor of Geography
- Shao, Zhoude** (1994). B.S., Shandong University (China), 1982; M.S., Ibid., 1984; Ph.D., University of Minnesota, 1994. Professor of Mathematics
- Shea, Timothy** (2008). B.S., Lancaster Bible College, 1988; M.Ed., Millersville University, 2001; Ed.D., University of Virginia, 2009. Associate Professor of English
- Sheaffer, M.P.A.** (1967). B.S., Shippensburg University, 1961; M.A., Tulane University, 1963; Ph.D., Ibid., 1965. Professor of English
- Shelor, Erin J.** (2005). B.A., Furman University, 1992; M.A., East Tennessee State University, 1996; Ph.D., University of Kentucky, 2003. Assistant Professor of History
- Shettel, Jennifer W.** (2008). B.S.Ed., Millersville University, 1992; M.Ed., Pennsylvania State University, 1997; Ed.D., Widener University, 2009. Associate Professor of Early, Middle & Exceptional Education
- Shin, Duckhee** (1993). B.A., Sogang University (South Korea), 1978; M.A., Ibid., 1981; Ph.D., Indiana University, 1991. Assistant Professor of English
- Shoemaker, Lewis H.** (1987). B.A., Lehigh University, 1975; M.A., Pennsylvania State University, 1978; Ph.D., Ibid., 1980. Professor of Mathematics
- Sigel, Deborah** (1997). B.A., Carleton College, 1986; M.F.A., Cranbrook Academy of Art, 1991. Professor of Art & Design; Chairperson, Department of Art & Design
- Sikora, Todd D.** (2005). B.S., Pennsylvania State University; M.S., Ibid., 1992; Ph.D., Ibid., 1996. Professor of Earth Sciences
- Smith, Carrie Lee** (2005). B.A., University of California, 1996; M.A., Vanderbilt University, 1998; Ph.D., Ibid., 2004. Associate Professor of Sociology
- Smith, Kenneth W.** (2000). B.S., University of Minnesota, 1986; M.S., University of Wisconsin-Madison, 1989; Ph.D., Ibid., 1993. Associate Professor of Economics; Chairperson, Department of Economics
- Smith-Wade-El, Rita R.** (1983). B.A., Barnard College, Columbia University, 1970; M.A., University of Pennsylvania, 1971; Ph.D., Ibid., 1979. Professor of Psychology
- Snyder, Mark R.** (2005). B.S.Ed., Millersville University, 1984; M.A., Eastern Michigan University, 1985; Ed.D., Virginia Polytechnic Institute and State University, 1992. Associate Professor of Applied Engineering, Safety & Technology
- Sommar, Mary E.** (2008). B.A., Temple University, 1975; M.Div., Yale University, 1990; Ph.D., Syracuse University, 1998. Assistant Professor of History
- Sorhagen, Nicole** (2015). B.A., Bloomsburg University of Pennsylvania, 2007; M.S., Villanova University, 2009; Ph.D., Temple University, 2014. Assistant Professor of Psychology
- Spicer, Robert N.** (2014). B.S., Millersville University, 2000; M.A., Temple University, 2003; Ph.D., Rutgers University, 2014. Assistant Professor of Communication & Theatre
- Suliman, Osman** (1993). B.S., University of Khartoum (Sudan), 1977; M.A., Indiana University, 1979; Ph.D., Ibid., 1984. Professor of Economics
- Szczyrbak, Gregory E.** (2004). B.A., Millersville University, 1995; M.S., Drexel University, 2000. Assistant Professor of Library
- Tacka, Philip V.** (2002). B.S., Towson State University, 1971; M.M., Catholic University, 1979; D.M.A., Ibid., 1982. Professor of Music

- Tamakloe, Deborah** (2015). B.Ed., University of Education Winneba (Ghana), 2004; M.A., University of Ghana, 2008; Ph.D., Washington State University. Assistant Professor of Department of Early, Middle & Exceptional Education
- Taylor, Cynthia E.** (2011). B.S., Indiana University of Pennsylvania, 1988; M.S., Rensselaer Polytechnic Institute, 2002; Ph.D., University of Missouri 2011. Assistant Professor of Mathematics
- Thyrum, Elizabeth Towner** (1994). B.A., Millersville University, 1986; M.S., Rutgers University, 1989; Ph.D., Ibid., 1992. Associate Professor of Psychology; Assistant Chairperson, Department of Psychology
- Trussell, Timothy** (2006). B.S., Oregon State University, 1991; M.S., Ibid., 1997; Ph.D., Texas A&M University, 2004. Associate Professor of Sociology/Anthropology
- Tuleya-Payne, Helena** (1992). B.S., Pennsylvania State University, 1972; M.S., Ibid., 1977; D.Ed., Ibid., 1983. Professor of Psychology
- Umble, Ronald N.** (1984). A.B., Temple University, 1972; M.S., University of Virginia, 1974; Ph.D., University of North Carolina, 1983. Professor of Mathematics
- Uy, Zenaida E.S.** (1981). B.S., University of the Philippines, 1964; M.A., State University of New York at Stony Brook, 1969; Ph.D., Ibid., 1972. Professor of Physics
- Vaillancourt, Robert B.** (2008). B.S., University of Massachusetts, 1984; M.S., University of Rhode Island, 1991; Ph.D., Ibid., 1996. Associate Professor of Earth Sciences
- Valentin-Márquez, Wilfredo** (2008). B.A., InterAmerican University of Puerto Rico, 1986; Western Michigan University, 2000; Ph.D., University of Michigan, 2007. Assistant Professor of Foreign Languages
- Volchansky, Vera** (2010). B.M., Mercyhurst College, 2000; M.M., Eastman School, 2004; D.M.A., University of Kansas, 2008; Assistant Professor of Music
- Vredenburg-Rudy, Debra S.** (2002). B.A., Slippery Rock University, 1990; M.A., Ibid., 1992; Ph.D., Ohio University, 1998. Associate Professor of Psychology
- Wagner, Ryan L.** (2005). B.S., South Dakota State University, 1996; Ph.D., Washington State University, 2001. Associate Professor of Biology
- Wallace, John R.** (1998). B.S., Pennsylvania State University, 1983; M.S., Shippensburg University, 1990; Ph.D., Michigan State University, 1997. Professor of Biology
- Walsh, Kathleen M.** (2007). B.S.W., University of Maryland, Baltimore, 1996; M.S.W., Ibid., 1997; Ph.D., Ibid., 2006. Associate Professor of Social Work
- Walsh, Talor** (2015). B.A., Oberlin College, 2007; M.S., University of Rochester, 2012; Ph.D., Ibid., 2015. Assistant Professor of Earth Sciences
- Wang, Jianfeng** (2014). B.S., Shanghai Fudan University (China), 1988; M.S., University of Science and Technology (China), 1999; M.B.A., University of Toledo, 2002; Ph.D., Ibid., 2006. Associate Professor of Management & Marketing
- Ward, Charles F.** (1997). B.S., California State University at Long Beach, 1985; M.A., Ibid., 1989; M.A., Johns Hopkins University, 1992; Ph.D., Ibid., 2001. Associate Professor of Philosophy; Chairperson, Department of Philosophy
- Ward, John** (1998). B.A., Kalamazoo College, 1977; M.A., University of Detroit, 1995; Ed.D., University of Memphis, 1998. Associate Professor of Educational Foundations; Interim Associate Dean, College of Education and Human Services
- Warner, Scott** (2004). B.S., Millersville University, 1985; M.A., Ball State University, D.Ed., West Virginia University, 2000. Associate Professor of Applied Engineering, Safety & Technology
- Washington, H. Tyrone** (2013). B.S., Fayetteville State University, 1998; M.S., North Carolina State University, 2001; Ph.D., Ibid., 2012. Assistant Professor of Mathematics
- Webster, Roger W.** (1983). B.S., University of Maine, 1978; M.S., Bentley College, 1982; M.A., Temple University, 1985; Ph.D., Ibid., 1988. Professor of Computer Science
- Weis, Tracey M.** (1992). B.A., Duke University, 1977; M.A., Rutgers University, 1988; Ph.D., Ibid., 1994. Associate Professor of History
- Weisser, Teresa A.** (1999). A.B., Franklin & Marshall College, 1984; M.S., Drexel University, 1986. Assistant Professor of Librarianship
- Wenrich, Judith K.** (1994). B.S., Kutztown University, 1982; M.Ed., Lehigh University, 1985; Ed.D., Ibid., 1991. Professor of Early, Middle & Exceptional Education
- Whisenton-Davidson, LaVern R.** (1987). B.S., Morningside College, 1973; M.S., University of Notre Dame, 1975; Ph.D., Ibid., 1980. Professor of Biology
- White, Janet Ann** (2002). B.A., Grove City College, 1988; M.Ed., Millersville University, 1994; Ph.D., American University, 2002. Professor of Mathematics; Assistant Chairperson, Department of Mathematics
- Widmayer, Martha E.** (1989). B.A., Marymount College, 1966; M.A., American University, 1971; Ph.D., University of Miami, 1988. Assistant Professor of English
- Wiley, N. Keith** (1984). B.S., Mansfield University, 1973; M.M., Ball State University, 1978; D.A., Ibid., 1991. Associate Professor of Music; Director of Jazz Ensemble
- Wimer, Jeffrey W.** (2002). B.S.Ed., Slippery Rock University, 1989; M.S., Ohio University, 1990; Ph.D., University of Dayton, 2000. Associate Professor of Wellness & Sport Sciences
- Wismer, Michael G.** (1996). B.A., Messiah College, 1987; M.A., West Chester University, 1991; Ph.D., University of Delaware, 1997. Assistant Professor of Mathematics
- Wolfgang, Charlton** (2015). B.S., Messiah College, 1993; M.S.Ed., Lebanon Valley College, 2002; Ph.D., Drexel University, 2013. Assistant Professor of Early, Middle & Exceptional Education

- Woo, Tae O.** (1982). B.A., Seoul National University (South Korea), 1974; M.S., Purdue University, 1977; Ph.D., Ibid., 1982. Professor of Psychology
- Wood, Jennifer F.** (2004). B.A., Rockhurst College, 1988; M.A., Webster University, 1991; Ph.D., Bowling Green State University, 1999. Associate Professor of Communication & Theatre
- Woodall, Lowery** (2009). B.F.A., Houston State University, 2004; M.S., University of Southern Mississippi, 2007. Assistant Professor of Communication & Theatre
- Wright, John R. Jr.** (1999). B.S.I.T., Central Connecticut State University, 1993; M.S., Ibid., 1996; Ph.D., Iowa State University, 1998. Professor of Applied Engineering, Safety & Technology
- Wright, Tiffany** (2011). B.A., Gettysburg College, 1997; M.A., Millersville University, 2002; Ed.D., Johns Hopkins University, 2009. Assistant Professor of Educational Foundations
- Wushanley, Ying** (1996). B.S., Shanghai Teachers University (China), 1982; M.S., Washington State University, 1991; Ph.D., The Pennsylvania State University, 1997. Professor of Wellness & Sport Sciences
- Yalda, Sepideh** (1997). B.S., Saint Louis University, 1991; M.S., Ibid., 1993; Ph.D., Ibid., 1997. Professor of Earth Sciences (Meteorology)
- Yang, Ping** (2015). B.A., Xi'an International Studies University (China), 1995, M.A. Ibid., 2001; M.A., Bowling Green State University, 2004; Ph.D., Arizona State University, 2009. Assistant Professor of Communications & Theatre
- Yocom, Daniel H.** (1987). B.S., Lebanon Valley College, 1974; M.S., University of Pittsburgh, 1977; Ph.D., State University of New York at Stony Brook, 1983. Professor of Biology
- Zhan, Mingquan** (2003). B.S., Nanjing Normal University, 1990; M.S., Ibid., 1997. Professor of Mathematics
- Zhang, Yufeng** (2006). B.A., Shanghai International Studies University (China), 1994; M.A., University of Toledo, 2001; Ph.D., Purdue University, 2006. Assistant Professor of English
- Zimmerman, Barbara J.** (1987). B.S.N., The Pennsylvania State University, 1974; M.S., University of Delaware, 1985; Ph.D., Widener University, 1996. Professor of Nursing
- Zoppetti, Gary M.** (2002). B.S., California University of Pennsylvania, 1992; M.S., University of Delaware, 1997; Ph.D., Ibid., 2001. Associate Professor of Computer Science

REGULAR PART-TIME FACULTY

- Anderson, Joyce** (1986). B.A., Eastern College, 1978; M.A., Millersville University, 1984. Instructor of English
- Behrens, Joel P.** (1988). B.S., Lebanon Valley College, 1967; M.F.A., University of Michigan, 1968. Instructor of Music
- Brislin, Patricia C.** (1989). B.S., Marywood College, 1967; M.A., Villanova University, 1970. Instructor of Mathematics
- Ellis, Robert E.** (1990). B.A., Carson-Newman College, 1973; M.A., Marshall University, 1975. Instructor of Communication & Theatre
- Englar, Marcia L.** (1983). B.M.E., Augustana College, 1976; M.M., Peabody Conservatory of the Johns Hopkins University, 1986. Instructor of Music
- Garber, Diana** (2014). B.A., Millersville University, 1991; M.Ed., Ibid., 1997. Instructor of Mathematics
- Rosenberg, Lawrence A.** (1987). B.A., Beloit College, 1971; M.A., University of New Hampshire, 1975; Ph.D., Ibid., 1981. Assistant Professor of Sociology
- Staherski, Cheryl E.** (1986). B.S., Millersville University, 1976. Instructor of Music

CLINICAL FACULTY

Family Nurse Practitioner:

- Christiansen, Leif E., D.O.**, Board Certified Internal Medicine; M.D., University of Health Sciences, Missouri; Residencies: Flint Osteopathic Hospital, Michigan; Memorial Osteopathic Hospital, Michigan
- Fisher, Todd R.**, B.S., Muhlenberg College, 1981; M.D., The Pennsylvania State University College of Medicine, 1985; Harrisburg Hospital Family Practice Residency, 1988; American Academy Family Practice Board Certification 1995. Private practice
- Gray, Louis P.**, B.A., Johns Hopkins University, 1975; M.D., New Jersey Medical School, 1979; Lancaster General Hospital Family Practice Residency, 1982; American Board of Family Practice, 1982. Private practice
- Harsh, Kenetta.**, R.N., Lancaster General Hospital School of Nursing, 1992; M.S.N., Millersville University, 2000; American Nurses Credentialing Center Family Nurse Practitioner Certification, 1996. Practice: Bareville Medical Associates
- Hostetter, Jonathan D.**, R.N., Lancaster General Hospital School of Nursing, 1990; B.S.N., Millersville University, 1992; M.S.N., University of Pennsylvania, 1994; American Nurses Credentialing Center Family Nurse Practitioner Certification, 1996. Practice: Cornerstone Family Health Associates
- Kiser, Donna Lee**, CRNP, R.N., Community Medical Center/Marywood College, 1970; B.S.N., Millersville University, 1984; B.S.N., Ibid., 1998, Family Nurse Practitioner. Practice: Crossroads Family Practice
- Larrabee, Roland, J.**, B.A., University of Maine, 1976; M.D., University of Vermont College of Medicine, 1980; Lancaster General Hospital Family Practice Residency Program, 1983; American Board of Family Practice, 1995. Practice: Walter L. Aument Family Health Center

Minnick, Sandra S., R.N., Lancaster General Hospital School of Nursing, 1979; B.S.N., University of Kentucky, 1983; M.S.N., University of Pennsylvania, 1985; Post-Master's Certificate, Wilmington College, 1995; American Nurses Credentialing Center Family Nurse Practitioner, 1995. Practice: Elco Family Health Center

Monn, Jenny, CRNP, R.N., St. Joseph Hospital School of Nursing, 1995; B.S.N., Millersville University, 2003; M.S.N., Ibid., 2007; Certified Family Nurse Practitioner. Practice: Millersville University Health Services

Petrokonis, Andrea, R.N., Lankenau Hospital School of Nursing, 1981; B.S.N., Eastern College, 1988; M.S.M., University of Pennsylvania, 1989; ANCC Certification: Family Nurse Practitioners. Practice: Lancaster General Hospital

Pryzbylkowski, Anne, R.N., Lancaster General Hospital School of Nursing, 1983; B.S.N., Thomas Jefferson University, 1986; M.S.N., Millersville University, 2000. Practice: Millersville University Health Services

Redman, Francine L., CRNP, B.S.N., Catholic University, Washington, D.C., 1974; M.S.N., Millersville University, 1999; ANCC Certified Family Nurse Practitioner, 1999. Practice: Oyster Point Family Health Center, 1999-present

Sigmund, Elizabeth C., CRNP, B.S. in biology, University of Connecticut; B.S.N., Pace University New York; M.S.N., Ibid., Certified Family Nurse Practitioner. Member Sigma Theta Tau. Practice: East Petersburg Family Practice

Medical Technology:

Beitz, Edwin, MT(HHS), 1988; B.S., Lycoming College, 1990; M.H.A., St. Francis University, 2001; MLS(ASCP), 2004; Program Director, Medical Laboratory Science Program, WellSpan/York Hospital

Hurt, Stanley D., B.A., University of Maryland, 1996; M.D., University of Pittsburgh School of Medicine, 2002; AP/CP Residency and Surgical Pathology Fellowship, University of Pennsylvania, 2007; American Board of Pathology Certification, AP/CP, 2007; Medical Advisor, Medical Laboratory Science Program, WellSpan/York Hospital

Wood, Marie E., B.S., Millersville University, 1989; MT(ASCP); M.S., Indiana University of Pennsylvania, 1999. Program Director, Medical Laboratory Science Program, Pennsylvania College of Health Services

Nuclear Medicine:

Bailey, Linda, B.A., East Stroudsburg University; ARRT(N), 1990; CNMT, 1990. Clinical Supervisor, Reading Hospital

Barkdoll, Theresa, A.A., Hagerstown Community College; ARRT(N), 1994; CNMT, 1994. Clinical Supervisor, Meritus Medical Center

Brooks, Thomas, B.S., Saint Joseph University; D.O., Philadelphia College of Osteopathic Medicine; ABR, 1989. Medical Director, Nuclear Medicine Technology Program, Pennsylvania College of Health Sciences

Eichfeld, Erin, B.S., Millersville University; CNMT, 2007. Clinical Supervisor, Good Samaritan Hospital of Lebanon

Glenn, Jaime, A.S., Hagerstown Community College; ARRT(R), 2003; CNMT, 2004. Clinical Supervisor, Diagnostic Imaging Services

Grobinski, Robert, B.S., Temple University; BCNP, 1985. Clinical Supervisor, Cardinal Health

Grove-Nguyen, Jennifer, B.S., York College; CNMT, 1998. Clinical Supervisor, York Hospital

Hoffert, Kathleen, B.S., Cedar Crest College; ARRT(N), 1986; CNMT, 1986. Clinical Supervisor, Lehigh Valley Hospital

Hoffman, Brandon, A.A.S., Lancaster General College of Nursing & Health Sciences; CNMT, 2004; NCT, 2007. Clinical Supervisor, Geisinger-Lewistown Hospital

Mancini, Paula, B.S., Millersville University; M.H.A., The Pennsylvania State University, 2002; ARRT(N), 1987; CNMT, 1987. Program Chair, Nuclear Medicine Technology Program, Pennsylvania College of Health Sciences

McCarty, Marcy, B.S., Millersville University; ARRT(R), 1996; ARRT(N), 1997; Clinical Coordinator, Nuclear Medicine Technology Program, Pennsylvania College of Health Sciences

Miles, Connie, B.S., Millersville University; ARRT(N), 1994; CNMT, 1994. Clinical Supervisor, Lancaster General Hospital

Sanders, Kathy, A.S., Quinipiac University; CNMT, 1986. Clinical Supervisor, St. Luke's University Hospital

Taylor, Tammy, A.A., Wor-Wic Community College; ARRT(R), 2003; CNMT 2005. Clinical Supervisor, Peninsula Imaging

Virgil, Muriel, B.S., University of Victoria; ARRT(R), 2000; CNMT, 2003. Clinical Supervisor, Peninsula Regional Medical Center

Winemiller, Katie, B.S., York College; CNMT, 2006; Clinical Supervisor, Memorial Hospital of York

Respiratory Therapy:

Ahmad, Masood, M.D. F.Sc., Pre-Medicine, Government College, Gujranwala, Pakistan, 1989; M.B., B.S., Nistar Medical College, Multan, Pakistan, 1996. Board Certifications: Internal Medicine, 2004; Critical Care Medicine, 2007; Pulmonary Disease, 2010; Sleep Medicine, 2011. Medical Director

Chrissos, Elaine, B.S.Ed., Millersville University, 1980; Millersville University Program in Respiratory Therapy, 1988; RRT, 1989. Program Director

Harleman, Jarrod, B.S., Millersville University Program in Respiratory Therapy, 2010; RRT, 2011. Neonatal-Pediatric Specialist, 2011. Director of Clinical Education

FACULTY AND ADMINISTRATIVE EMERITI

- See listing at www.millersville.edu/provost

Millersville University does not discriminate on the basis of race, color, religion, national origin, ancestry, sex, age, or disability in admission or access to, or treatment or employment in, its programs and activities. This includes Title VI of the Civil Rights Act of 1964, Title IX of the Educational Amendments of 1972, and the Americans with Disabilities Act of 1990.

Coordinators: Services for Students with Disabilities—Dr. Sherlynn Bessick, Director, Office of Learning Services, Lyle Hall, 717-872-3178; Title VI and Title IX—Mr. Hiram Martinez, Assistant to the President for Social Equity and Diversity, Delaware House, 717-872-3787; ADA Coordinator— Mr. Louis DeSol, Associate Vice President for Human Resources, Dilworth Building, 717-872-3017.

Policy on Auxiliary Aids

Millersville University does not discriminate on the basis of disability status in admission or access to its programs and activities. Individuals are encouraged to make the University aware of any permanent or temporary disability. Arrangements will be made to secure auxiliary aids and services, when necessary, to ensure that such students are not denied the benefits of, excluded from participation in, or otherwise subjected to discrimination under programs and/or activities at Millersville University. This policy extends to full-time, part-time and nondegree students, and students enrolled in both credit and noncredit courses.

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Safety & Security Information

For current information about Millersville University campus security, in conformity with the requirements of Pennsylvania Act 1988-73, the College and University Information Act, and the federal Crime Awareness and Campus Security Act of 1990, contact University Police, Millersville University, P.O. Box 1002, Millersville, PA 17551-0302; phone (717) 872-3433; or www.millersville.edu/police.