

Millersville University



We will
seize the opportunity.



2009 - 2010
Undergraduate
Catalog

Millersville University

SEIZE THE OPPORTUNITY

Undergraduate Catalog

2009-2010

An undergraduate catalog is published every year by the Millersville University Council of Trustees. This publication and its printed counterpart are announcements for the 2009-2010 academic year. The catalog is for informational purposes only and does not constitute a contract. The provisions of this catalog are not intended to create any substantive rights beyond those created by the laws and constitutions of the United States and the Commonwealth of Pennsylvania and are not intended to create, in and of themselves, any cause of action against the Pennsylvania State System of Higher Education, the Board of Governors, the Chancellor, an individual President or University, or any other officer, agency, agent or employee of the Pennsylvania State System of Higher Education.

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 the Pennsylvania
State System of Higher Education

TABLE OF CONTENTS

UNIVERSITY CALENDAR	5
I. INTRODUCTION	6
History.....	7
Mission.....	7
Curriculum and Programs.....	8
Accreditation.....	8
The Student Body.....	8
II. ADMISSION & FINANCES	9
Admission to Millersville University	10
General Admission Policies for All Applicants to Undergraduate	
Degree Programs	10
Special Admission Programs for Degree-Seeking Applicants	11
Nondegree Students Applying for Degree-Seeking Status.....	13
Adult and Nontraditional Students.....	13
Special Admission Students	13
Advanced Standing.....	14
Expenses and Financial Aid	16
University Scholarships and Awards	21
Scholarships–Academic.....	21
Scholarships–Athletic.....	28
University Awards.....	29
III. ACADEMIC REQUIREMENTS, OPPORTUNITIES & POLICIES	34
Academic Requirements	35
The Baccalaureate Curriculum.....	35
Proficiency Requirements	35
The General Education Program.....	35
General Education Structure.....	36
The Major Program.....	37
The Associate Degree Curriculum.....	38
Other Curricular Policies	38
Special Academic Opportunities	39
Honors College and Departmental Honors	39
On-Campus Academic Opportunities.....	40
Off-Campus Academic Opportunities.....	40
Special Events.....	43
Special Funds.....	43
Academic Policies	45
Grading Policies.....	45
Academic Standards.....	47
Semester Credit Load Policies.....	48
Leaving Millersville University	49
Other Academic Policies.....	49

IV. CAMPUS LIFE	52
Services for Students	53
Student Housing	56
Student Activities.....	56
Special Educational Facilities	58
Student Policies.....	60
V. ACADEMIC PROGRAMS	64
Undergraduate Programs	65
Graduate Programs	69
Undergraduate Programs of Study (Course Descriptions)	71
African-American Studies.....	71
Army ROTC	73
Art.....	74
Biology	81
Respiratory Therapy	91
Business Administration.....	93
Chemistry	99
Communication & Theatre.....	103
Computer Science.....	108
Cooperative Education/Internship.....	112
Earth Sciences	112
Economics.....	119
Educational Foundations.....	122
Elementary & Early	
Childhood Education.....	124
English.....	129
Environmental Hazards &	
Emergency Management	139
Environmental Studies.....	140
Foreign Languages.....	143
Geography.....	157
Gerontology.....	160
Government & Political Affairs.....	161
History	164
Honors College.....	168
Humanities	170
Industry and Technology	171
International Studies	179
Latino Studies	180
Mathematics.....	182
Music.....	189
Nursing	194
Philosophy.....	196
Physics	198
Psychology.....	203
Social Sciences	208
Social Studies.....	208
Social Work	209

Sociology/Anthropology.....	211
Special Education	217
Wellness & Sport Sciences.....	221
Women’s Studies.....	223

VI. DIRECTORY	226
Governing Boards.....	227
Administration	228
Administrative Staff	231
Faculty.....	231
Faculty Emeriti.....	242

UNIVERSITY CALENDAR 2009-2010

FALL TERM 2009

TUES	AUG 25	Orientation for new students admitted for Fall 2009 begins
FRI	AUG 28	Orientation for new students admitted for Fall 2009 ends
MON	AUG 31	Fall classes begin
MON	SEP 07	Holiday (no classes)
FRI	OCT 09	Fall recess begins after last class
WED	OCT 14	Fall recess ends at 7:00 a.m.
FRI	OCT 23	Homecoming Weekend
SAT	OCT 24	Homecoming Weekend/Community Day
SUN	OCT 25	Homecoming Weekend
FRI	NOV 06	Family Weekend
SAT	NOV 07	Family Day
SUN	NOV 08	Family Weekend
TUE	NOV 24	Thanksgiving recess begins after last class
MON	NOV 30	Thanksgiving recess ends at 7:00 a.m.
SAT	DEC 05	Orientation for new students admitted for Spring 2010
TUE	DEC 15	
	through	Evaluation period (special class schedule)
SAT	DEC 19	
SUN	DEC 20	Commencement; End of fall term

WINTER TERM 2010

MON	DEC 21	Winter classes begin
SUN	JAN 17	Winter classes end after last final examination

SPRING TERM 2010

TBD		Scheduled for "missing Monday" evening classes
TBD		Scheduled for "missing Monday" day classes
MON	JAN 18	Holiday (no classes)
TUE	JAN 19	Spring classes begin
FRI	MAR 05	Spring recess begins after last class
MON	MAR 15	Spring recess ends at 7:00 a.m.
SAT	APR 24	Alumni Weekend
SUN	APR 25	Alumni Weekend
TUE	MAY 04	
	through	Evaluation period (special class schedule)
FRI	MAY 07	
SAT	MAY 08	Commencement; End of spring term

SUMMER 1 TERM 2010

MON	MAY 17	Summer 1 classes begin
MON	MAY 24	Holiday (no classes)
FRI	JUN 11	Summer 1 classes end

SUMMER 2 TERM 2010

MON	JUN 14	Summer 2 classes begin
MON	JUL 05	Holiday (no classes)
FRI	JUL 16	Summer 2 classes end

SUMMER 3 TERM 2010

MON	JUL 19	Summer 3 classes begin
FRI	AUG 20	Summer 3 classes end

FALL TERM 2010

MON	AUG 30	Fall classes begin
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Introduction

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 the Pennsylvania 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 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, a 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 Ganser Library 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. The Adult and Continuing Education (ACE) Program was established in 1995 to meet the needs of working adults by offering degree programs in the evening and on weekends.

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 of Millersville University today is summarized in a mission statement adopted by the Strategic Planning and Resource Council and approved by the Council of Trustees in 2008. Millersville University recognizes excellence in teaching and learning as its reason for being and is committed to offering students a high quality, comprehensive university experience of exceptional value. Dedicated to providing nationally recognized programs that embrace the liberal arts, the University provides academic opportunities which are supported by outstanding faculty who are also accomplished scholars, artists and practitioners and are supported by a talented and dedicated professional staff.

The University provides an extensive range of academic and professional programs to meet the interests and needs of both undergraduate and graduate students. To better prepare students for a diverse society and workforce, the University embraces diversity of people, cultures, ideas and viewpoints. By balancing traditional and innovative learning environments both inside and outside of the classroom, this inclusive campus community enhances learning outcomes and better equips students for their chosen professions.

By preparing students to become well-rounded individuals for productive roles as civic and community engaged leaders and citizens, Millersville University contributes to the public good. The University stimulates intellectual and creative energy that fosters the growth of our students, faculty and staff and contributes to the social, political and economic advancement of the Commonwealth and the

wider world. The Millersville University community pledges itself to academic freedom and encourages imagination and curiosity, unfettered discourse, the exchange of divergent and controversial opinion, and multicultural awareness and understanding within an environment of civility, mutual respect and cooperation.

CURRICULUM AND PROGRAMS

Millersville offers 51 bachelor's and three associate, degree programs in the arts and sciences, business, industrial technology and education fields, 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 master's degrees in 21 programs in the arts and sciences and education, as well as selected certification programs.

A number of special educational opportunities are provided, including honors programs, independent study, field experiences, study at other institutions and abroad, and developmental course work.

Millersville University's faculty, staff and services reflect the University's concern for student growth and development. There are approximately 314 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 Association of Colleges and Schools, 3624 Market Street, Philadelphia, PA 19104, phone (215) 662-5606; the Pennsylvania Department of Education, and is approved by the American Association of University Women. Teacher Education programs are accredited by the National Council for Accreditation of Teacher Education, and the University is a member of the American Association of Colleges for Teacher Education. The respiratory therapy program is accredited by the Commission on Accreditation of Allied Health Education Programs, 1361 Park Street, Clearwater, FL 33756, 727-210-2350 and the Committee on Accreditation of Respiratory Care, 1248 Harwood Road, Bedford, TX 76021-4244, 817-283-2835. The social work program is accredited by the Council of Social Work Education. The music program is accredited by the National Association of Schools of Music. The nursing program is accredited by the National League for Nursing Accrediting Commission, 350 Hudson Street, New York, NY 10014, phone (212) 989-9393. The chemistry program is accredited by the American Chemical Society. The computer science program is accredited by the Computer Science Accreditation Board. The occupational safety and environmental health program is accredited by the Accreditation Board for Engineering and Technology. The industrial technology program is accredited by the National Association of Industrial Technology. The Technology Education program is in full compliance with the International Technology Education Association/Council on Technology Teacher Education guidelines for technology teacher education. The business administration program is accredited by the Association of Collegiate Business Schools and Programs. The school psychology certification program is accredited by the National Association of School Psychologists. The art program is accredited by the National Association of Schools of Art and Design. The Center for Counseling and Human Development is newly accredited by the International Association of Counseling Services.

THE STUDENT BODY

Millersville University enrolls approximately 8,300 students. More than 79 percent are full-time undergraduates; the rest are part-time undergraduates and graduate students. About 56 percent of undergraduates are women and one in ten is at least 25 years old. About 64 percent of Millersville's undergraduates come from southeastern Pennsylvania.

Millersville University is a selective institution, admitting 55% of the approximately 6,650 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 1050 and approximately 70 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

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: (800) MU-ADMIT; (717) 872-3371 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 an academic program which includes the following course work: 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; and three or more units of academic social science course work. Foreign language course work at the secondary level is recommended but not required for admission consideration. Also required are satisfactory scores on the SAT or the 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, 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 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 writing to 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 \$35 for the electronic application or \$50 for the paper application.

Although not required, applicants are encouraged to have 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 the senior year as possible. Applicants may apply for admission to begin course work in the fall or spring 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 an advance matriculation deposit no later than April 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. If necessary, students admitted to the fall semester may extend the deposit deadline to May 1 by submitting a written request to the admissions office prior to April 1.

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 ADMISSION PROGRAMS FOR DEGREE-SEEKING APPLICANTS

THE AIM FOR SUCCESS/ACT 101 PROGRAM

The AIM for Success/Act 101 Program is an academic enrichment program partially funded by the Higher Education Equal Opportunity Act (Act 101). Students are admitted on the basis of their demonstrated potential, motivation, and commitment to their college success and must meet educational and economic guidelines. The program provides placement testing, developmental instruction, academic advisement, counseling and academic support services. To facilitate transition into the University, students begin their studies in the summer before their freshman year.

TRANSFER APPLICANTS

Students who have completed a minimum of 12 transferable credits of course work at another regionally accredited institution 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 transferrable 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 school for at least one semester and meet freshman admissions criteria.

Pennsylvania State System of Higher Education (PASSHE) Academic Passport. Millersville participates in this program that 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 course work 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 institution may be transferable.

Harrisburg Area Community College (HACC)/Millersville University Dual Admission Program. This is a dual advisement program designed to assist students who begin their studies at HACC and earn an associate degree prior to transferring to MU. Students apply to the HACC / MU dual admissions program through their HACC transfer center. The MU admissions office receives the student's HACC transcript at the completion of each semester. A credit evaluation is provided and credits are entered into the student's MU academic record. Students participating in the HACC/MU dual program are allowed access to a degree audit report to see how HACC credits apply towards an MU degree. Early in their final semester at HACC (prior to earning an associate degree) Millersville will formally admit participants to MU for the semester specified by the student when they entered the program. With special permission of both HACC and MU, students may enroll in a limited number of MU courses while pursuing the HACC 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 full-time students. In general, transfer credit is awarded for college-level courses in fields of study offered at Millersville that were completed with a C- or higher on the campus of 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 at 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 MU, 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 500 or higher on the written Test of English as a Foreign Language (TOEFL), or a score of 183 or higher on the computer-based TOEFL, or a score of 65 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 above, transfer students with academic credentials from outside of the United States must have their college/university credentials and mark sheets sent to a recognized credential evaluation service for evaluation, as well as the admissions office. Original or certified copies of your academic credentials must also be sent directly to the Millersville University admissions office. Two such 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 a rigorous college preparatory curriculum, superior high school rank and SAT scores, and a recommendation from the high school principal. A personal interview is required.

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 NLNAC accredited hospital diploma school of nursing or an NLNAC 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 MAJORS

Applicants for the B.F.A. in art, B.A. in art or the art education B.S.Ed. in art education programs, including transfer applicants, must submit an art portfolio for review *after* acceptance to the University. 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, 3-5 of those should be drawings with at least two of the drawings from direct observation. There will be no in-person reviews. Portfolio review deadlines are October 1, November 1, January 1, and March 1, reviews will not take place at any other time.

MUSIC MAJORS

Applicants for the B.A. in Music Business and 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 in Byerly Hall at (717) 872-3357 or (717) 871-2061.

ATHLETIC TRAINING/BIOLOGY DUAL DEGREE

Millersville University, in conjunction with West Chester University, offers two dual degree programs, one 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, while a second athletic training bachelor's degree is earned through West Chester University. 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 course work 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 aid 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 and 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 course work and grades remain on the permanent record but are not included in the calculation of the MU CGPA after amnesty is granted. Students may use courses taken in the preamnesty 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 semesters. Application forms are submitted to the Millersville University Office of Admissions with a one-time application fee of \$35 if applying electronically or \$50 if using the paper application.

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 if course work was completed at an institution previously attended.

Students who are granted admission will be assigned an academic adviser 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 adviser. Adult students are urged to meet with advisers 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 Office of Graduate and Professional Studies at profdev@millersville.edu, or at (717) 872-3030.

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 123. To apply for admission, contact the Office of Graduate and Professional Studies, Lyle Hall.

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

Qualified high school students may take credit courses at Millersville while pursuing their high school diplomas. Applicants must submit an official transcript and a letter of recommendation from their high school principal. 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 the Millersville admissions office. Participation in this program does not guarantee later admission as a degree-seeking student. Home-schooled students are encouraged to contact the admissions office for additional details.

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 Office of Financial Aid for information on educational benefits.

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.

Attendance Fee Program. This is a special audit program for nondegree students to permit them to try a college course, improve career skills and otherwise enrich themselves at relatively low cost. Approval of the course instructor is required. Unlike other auditing students, attendance fee students have no transcript record noting the course. Matriculated students have first priority for class space. Specified courses which require minimum skills or physical considerations for instructional purposes may not be open to attendance fee students. Typically these include art studios, science and technology labs, physical education classes, instrumental or vocal music, and similar classes.

The cost to attend a class on an attendance fee basis is the current rate for one credit plus the general fee. For more information, contact the Office of Professional Training & Education, Lyle Hall, (717) 872-3030.

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 AP credit award. A score report from the College Board must be sent to MU. Visit www.millersville.edu/registrar/ for more information regarding score reports.

COLLEGE LEVEL EXAMINATION PROGRAM (CLEP)

CLEP is a program of the College Board which includes both general and subject examinations. Six (6) 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 course work has been taken, whether the course was passed or not.

Three (3) to six (6) credits are awarded to students who earn a score of 50 or above on the CLEP subject examinations. Currently enrolled MU students must obtain written permission from the department chair where the content of the subject examination is taught at MU prior to taking a subject examination.

Contact the University Test Center, Lyle Hall, at www.millersville.edu/gps 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 of 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 has 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 considers it seriously when evaluating the credentials of admission 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. Public funds appropriated by the Pennsylvania legislature pay for building construction costs and approximately half of Millersville's operating budget. The state appropriation is in essence a scholarship that permits a quality education at an affordable price for every student.

The table below and other information in this section presents 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*	\$5,358.00	\$13,396.00
General Fee*	1,327.00	1,327.00
Technology Fee*	181.00	273.00
Room and Meals	7,308.00	7,308.00
Estimated books and supplies costs	1,000.00	1,000.00
Estimated personal costs	1,687.00	1,687.00
Estimated travel costs	800.00	800.00

*08-09 rates. Rates will change.

PAYMENT OF TUITION & 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 Millersville Access System (MAX). 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 are found at www.millersville.edu/osa or at the Office of the Bursar, Dilworth Building. Credit card payments can be made using MAX online.

Installment Payment Plan. Millersville University offers an installment payment plan to all students and parents to help meet educational costs. The Millersville University Installment Payment Plan (MIPP) enables participants to make 12 regularly scheduled monthly installments beginning May 1 or six monthly payments for a single semester contract. Spring contracts begin November 1. In addition, MIPP allows participants to determine how much of their tuition, room and board, and fees they may want to pay in installments. This feature affords participants the ability to budget costs as best fits their personal situation. Questions should be directed to the MIPP coordinator, bursar's office, Dilworth Building. Application forms can be printed from the Millersville website, in the Student Forms Center, or go to the bursar's homepage.

NOTE: Enrollment closes August 1 for annual or fall-only contracts, and closes December 1 for spring-only contracts.

TUITION

Tuition charges are set in July by the Board of Governors of the Pennsylvania State System of Higher Education and are uniform throughout the 14 state-owned universities.

Tuition for Residents of Pennsylvania. Full-time undergraduates pay \$2,679.00* per semester for 12 to 18 credit hours plus \$223.00* for each credit hour over 18. Part-time undergraduates enrolled for fewer than 12 credit hours pay \$223.00* per credit hour. All undergraduates pay \$223.00* per credit hour during winter and summer sessions.

Tuition for Nonresidents of Pennsylvania. Full-time undergraduates pay \$6,698.00* per semester for 12 to 18 credit hours plus \$558.00* per credit hour over 18. Part-time undergraduates enrolled for fewer than 12 credit hours pay \$558.00* per credit hour. All undergraduates pay \$558.00* per credit hour during winter and summer sessions.

*08-09 rates. Rates will change. For up to date fee information please refer to bursar's website at millersville.edu/bursar.

Tuition for International Students. International students are charged out-of-state 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 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 non-refundable after the drop/add period and the refund of tuition and general fee will be based on the following schedule for the fall and spring semester.

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 MU 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 government, 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 2008-2009* fee is \$663.50 per semester for full-time undergraduate students and \$55.75 per credit hour for part-time undergraduate students.

*Rates subject to change for 09-10.

TECHNOLOGY FEE

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

The 2008-2009* fee is \$90.50 per semester for full-time Pennsylvania residents, and \$136.50 per semester for full-time nonresidents. Part-time Pennsylvania residents pay \$44.00 per semester and part-time nonresidents pay \$67.00 per semester.

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

*Rates subject to change for 09-10.

HOUSING AND MEAL PLAN FEES

The 2009-2010 housing and meals rate is \$3,883.00 per semester and \$1218.05 for a five-week summer session.

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 Wednesday 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 halls.

Meal plan per semester:

\$1,800.00	Captains Plan, plus \$200 Flex*
\$1,579.00	19 meals per week, plus \$150 Flex*
\$1,506.00	14 meals per week, plus \$100 Flex*
\$1,259.00	9 meals per week, plus \$100 Flex*
\$813.00	5 meals per week, plus \$100 Flex*
\$855.00	Block Meals
\$200.00	Flex Only

*Note: Flex dollars will now roll forward from fall to spring.

The 2009 summer meal plan charge for a five-week summer session:

\$493.35	19 meals per week
\$470.70	14 meals per week
\$393.35	10 meals per week
\$254.00	5 meals per week

Visitors and students who live off campus are also welcome to dine in University dining halls on an occasional basis. Breakfast costs \$4.75*; lunch, \$6.70*; dinner, \$8.60*; and brunch, \$8.60*. Rates for special events are available from the University Food Service, Gordinier Dining 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.

Marauder Gold. Money deposited into your Marauder Gold account may be used to make purchases at campus locations 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 and MIPP balance may not be used.

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

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 \$35 for an electronic submission, or \$50 for a paper submission, only once. This is a non-refundable 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.

MIPP Delayed Payment Fee. Installment payment plan participants are charged \$10 when payments are not received by the first day of the month.

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 Fees. The fee for replacement of a Millersville student identification card is \$15.

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

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

Infirmery Supplies Fee. The cost of any expensive supplies used to treat a patient at the infirmary 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 \$100 deposit is required upon acceptance of the offer of admission. It may be used 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. 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 (\$25) of the fall semester deposit is made if written notification is received by the admissions office no later than May 15.

Advance Housing Deposit. Students admitted to University residence halls must pay a deposit of \$125 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 resident life office no later than July 1.

OTHER EXPENSES

Most students incur additional expenses for books and supplies, personal needs and travel to and from home. While these expenses vary widely, the University provides estimates for the purpose of determining financial need for grants and loans.

The total annual expense for Pennsylvania residents living in University residence halls is estimated at \$16,277 (\$23,845 for nonresidents).

The total annual expense for commuting students who live with their parents or guardians while attending school is estimated at \$13,001.

The total annual expense for off-campus students who are renting temporary housing in the Millersville/Lancaster area is estimated at \$17,537. This amount assumes the student is sharing facilities and rental costs with at least two other persons.

For more information about estimated expenses and their impact upon financial aid, contact the Office of Financial Aid, Lyle Hall.

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 assistance is available to Millersville students through grants, scholarships, employment, and loans. Contact the Office of Financial Aid for information and application or visit the 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. Some of the larger programs are the Clarence Schock Foundation, Search for Excellence, MEDAL Fund scholarship programs, and the Board of Governors tuition waiver program. Information on these and other University scholarships follows the *Financial Aid* section.

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 January 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.

Academic Competitiveness Grant (ACG). Available to first and second year students, who are U.S. citizens or eligible non-citizens, have been awarded a Federal Pell grant, and who have successfully completed "a rigorous secondary school program of study." To apply for the ACG, complete the FAFSA online and complete the questionnaire at the end of the application process. Your eligibility will then be determined by the Office of Financial Aid. You will be notified if you are awarded the ACG in your financial aid award package.

National Science and Mathematics Access to Retain Talent (SMART) Grant. Available to third and fourth year students who are U.S. Citizens or eligible non-citizens, have been awarded a Federal Pell Grant, and are majoring in fields of study relating to the sciences and mathematics. To apply for the National SMART grant, complete the FAFSA. Your eligibility will then be determined by the Office of Financial Aid and you will be notified if you are awarded the National SMART Grant in your financial aid 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 January 1.

Grant sizes vary depending 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.

STUDENT EMPLOYMENT PROGRAMS

Federal Work-Study Program (FWS). This program provides funds for students who have financial need. Students are eligible if they are enrolled at least half-time (6 credits).

Students who have FWS eligibility may also work in the community through the Community Service Learning Program (CSL). Contact the coordinator of community services in Bedford House for a list of available positions, (717) 871-2223. If you do not have FWS eligibility, you may participate in the CSL Program on a volunteer basis.

Millersville University Student Employment Program. This program differs from the Federal Work-Study Program in that students do not have to demonstrate financial need in order to qualify.

Available jobs are posted in the Payroll Office (Dilworth Building) and the Office of Career Services (Lyle Hall).

LOAN PROGRAMS

Federal Perkins Loans. This program is for students who complete the Free Application for Federal Student Aid (FAFSA) and 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 ten years to repay. During the repayment period, five percent interest is charged on the unpaid balance of the principal.

Federal Stafford Loan Program. This program enables students to borrow directly from a participating lender. Millersville University will determine a student's borrowing eligibility and pre-certify a loan with American Education Services (AES). The student may complete their master promissory note (MPN) online after Millersville University precertifies the loan at www.aesSuccess.org. After AES receives the completed MPN, the loan can be guaranteed. If you prefer to use another guarantor other than AES, please notify the Office of Financial Aid and your loan will be certified accordingly.

To be eligible, a student must complete the Free Application for Federal Student Aid (FAFSA) and be enrolled at least half-time (6 credits). The maximum loan for an undergraduate ranges from \$5,500 to \$7,500 per year, based on grade level.

Federal Stafford loans can be subsidized or unsubsidized. The government pays the interest on the subsidized loan while the student is enrolled. On the unsubsidized loan, the student is responsible for the interest while enrolled.

Repayment normally begins six months after leaving school with up to ten years to repay. The amount of repayment depends upon the total debt and ability to pay.

Federal PLUS Loans. Available to parents of dependent undergraduate students. Additional information can be obtained from the Office of Financial Aid or online at www.millersville.edu/finaid.

Graduate PLUS Loans. These loans are available for graduate and professional students. Additional information can be obtained from the Office of Financial Aid or online at 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 \$100 and must be repaid within 30 days. These loans cannot be used to pay University charges. Applications and additional information are available from the Office of Financial Aid.

ACADEMIC PROGRESS POLICY

In order to receive federal and state student financial aid, a student must pass a prescribed number of new credits each academic year. A new credit is defined as a credit for which the student did not receive a previous grade of A, B, C, D or pass. For federal student aid, this policy includes all degree-seeking students, regardless of receipt of federal aid. The full policy is available for review on the Millersville financial aid website.

Student's Enrollment Status (number of credits per semester a student is registered for at the end of the drop/add period)	Number of NEW credits that must be earned per SEMESTER to maintain financial aid eligibility	Number of NEW credits that must be earned per ACADEMIC YEAR to maintain financial aid eligibility
Undergraduate full-time (12 or more)	12	24
Undergraduate 3/4-time (9-11)	9	18
Undergraduate half-time (6-8)	6	12
Undergraduate less than half-time (3-5)	3	6
Graduate full-time (9 or more)	9	18
Graduate half-time (6-8)	6	12
Graduate less than half-time (3-5)	3	6

Failure to pass the prescribed number of new credits during an academic year will result in the loss of eligibility for financial aid. Students may take credits without financial aid during winter and/or summer sessions to regain eligibility for the following academic year.

UNIVERSITY SCHOLARSHIPS AND AWARDS

A scholarship is a financial grant for a student's University expenses. These grants are usually given based on financial need and/or particular academic or athletic excellence.

The University Scholarships marked with an asterisk(*) are awarded to incoming students. For more information regarding freshman scholarships, contact the admissions office, and for general information regarding scholarships, contact the Office of Financial Aid.

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 and maintain a 3.0 GPA and be a sophomore, junior or senior for renewal.

***AFSCME Local 2421 Scholarship.** Awarded annually by the American Federation of State, County and Municipal Employees to a student graduating from each Lancaster County high school.

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.

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

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.

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.

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.

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.

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.

James C. Atty Memorial Scholarship. Awarded to a student of the counselor education program on the basis of financial need and potential as a counselor.

Laurene Cassady Auken Scholarship. Awarded to students demonstrating financial need.

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.

Beth Ann Barry Memorial Scholarship in Computer Science. Awarded to one (1) 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 (1) additional year, provided that student's GPA remains at 3.0 or greater.

***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.

Elva W. Biemesderfer Scholarship. Awarded to a student in the communication and theatre curriculum with a concentration in theater.

***Richard and Elaine Blouse Scholarship Endowment.** 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.

***Board of Governors Scholarships.** Awarded primarily to minority students for yearly tuition and renewable each year that the recipients maintain acceptable academic standards. Twenty percent of the scholarships are used to support academically talented students regardless of minority status.

***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.

***Chip and Kathy Brabson, Ph.D '70 Physics Scholarship.** Awarded to an incoming, full-time freshman physics major, 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 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 up to three years providing the student remains a physics major in good academic standing.

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 providing the student maintains a 3.2 GPA.

C-P Flexible Packaging - Gary Nicholas Memorial Scholarship. Awarded to a full-time rising senior in the occupational safety and environmental health program at MU, 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.

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.

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.

***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.

***Don R. and Judith C. Carter Endowment 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.

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.

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.

Christina A. Ciallella Memorial Scholarship. Awarded to a female student who has completed at least 60 credits at MU with no restriction upon major and based upon financial need.

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

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

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.

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

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.

Class of 1940 Scholarship. Awarded to a student who demonstrates financial need and who is majoring in education.

Class of 1942 Scholarship. Awarded annually to an outstanding education major who has achieved academic excellence and has demonstrated financial need.

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.

Class of 1944 Scholarship. Awarded to a student majoring in education, who has completed at least 60 credit hours and has demonstrated financial need.

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

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

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

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.

***Edna Butler Cohen '27 Mathematics Endowed 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.

***Elisabeth Ruth Cramer 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.

Gladys Cooper Cunningham Scholarship. Awarded to a junior or senior who is most outstanding in early childhood 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. Students' financial need shall be a determining factor.

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

***Dr. Dominick '53 and Mrs. Helen DiNunzio Scholarship Endowment.** 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.

William H. and Alma P. Duncan Scholarship in Elementary Education. Awarded to an elementary education major on the basis of financial need, excellence in scholarship, leadership qualities and service to others.

***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 art performance medium.

***James C. Ebbert Education Scholarship.** Awarded to two incoming freshmen students demonstrating financial need with a minimum high school GPA of 3.0 and in teacher preparation in the School of Education. First preference for the scholarship is to a student from the PA Migrant Education program, and then to a student participating in the Color of Teaching mentorship program. Scholarships will be disbursed to the students' account for tuition, fees, room and board.

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.

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 freshman and overall and major GPA for upperclassman) 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.

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.

***Elementary Education Scholarship.** Awarded to a freshman majoring in elementary education and based on financial need. Recipient must demonstrate high academic performance in high school record and strong community service during the final two years of high school. May be renewed for three additional years if student maintains a 3.0 GPA, remains in elementary education and actively pursues renewal prior to June 30 for the subsequent academic year.

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.

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.

Ermaleen B. Etter Scholarship in Special Education. Awarded to senior student teachers enrolled in the School of Education who have demonstrated professional excellence during their student teaching experience with learning disabled children.

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.

***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.

***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 a strong record of high moral character as demonstrated by community service and volunteer experience.

***Faraday Physics Scholarship.** Awarded to two entering full-time freshmen pursuing a BS, BA or BSEd 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, providing 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.

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

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

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.

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.

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.

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

***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.

Willard O. and Dr. Catherine Gibson Havemeier Scholarship in Computer Science. Awarded to a student engaged in computer science and robotics research. Recipient must have a GPA of 3.0 or higher. Award is restricted to related travel, materials and supplies.

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.

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

Albert, Christina and Eric Hoffman Scholarship for Humanities and Social Sciences. Awarded to a student in the honors college majoring in humanities and social sciences.

Albert, Christina and Gregory Hoffman Scholarship for Science and Mathematics. Awarded to a student in the honors college majoring in science and mathematics.

Alan S. & Adeline Holliday Scholarship. Awarded to a student who demonstrates scholastic ability and financial need.

***HomeTowne Heritage Bank Scholarship.** Awarded to an entering student in the Bank's service area with first preference to employees and their families of HomeTowne Heritage 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.

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

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

***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 have a history of participation in high school publications.

Gene Hummel Scholarship. Awarded to a junior education major who is a Lancaster County resident who graduated from a local high school with a passing cumulative grade point average and has financial need.

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 given to students from Lancaster County.

Jackson Memorial Scholarship. Established by Dr. George F. and Lelia M. Stauffer and awarded annually to a graduate of Hempfield High School who has completed the junior year and has attained distinguished achievement in elementary education. In the event no Hempfield High School graduate is eligible, the award is made to the highest ranking elementary education major from Lancaster County high schools.

***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.

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.

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

***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, providing the student maintains a 3.5 GPA in Spanish and a 3.0 overall GPA.

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

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

***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, providing the recipient remains in good academic standing and is approved by the faculty of his/her chosen major/discipline.

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.

***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. Scholarship may be renewed for eight semesters or until graduation, whichever is first.

E. Kathryn Millar Kraybill '15 Endowed Scholarship. Awarded to a student with financial need majoring in education.

***Richard S. Levandusky '58 Technology Education Scholarship.** Awarded to a first year student majoring in Technical Education. First preference to a student from Eastern Lebanon County High School.

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.

V. J. Marcelis Memorial Scholarship in Elementary Education. Awarded to a rising senior in good academic standing who intends to teach at the elementary level. Preference will be given to a student with financial need.

Violet F. Markey Academic Scholarship. Awarded for an academic scholarship as determined by the University president or designee.

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 MU with a GPA of 3.2 or higher and demonstrates financial need.

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

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.

Robert S. & Helen R. Metzler Scholarship in Elementary Education. Awarded to a student enrolled in the elementary education 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.

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.

***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.

Millersville University Business Associates Scholarship. Awarded to female nontraditional student(s) from Lancaster County enrolled in the professional training & education program. Students must be financially independent and have demonstrated financial need.

Kurtz J. & Mary A.C. Mock Memorial Scholarship. Awarded to a female enrolled in the elementary supervisor certificate program who possesses either a bachelor's or master's degree from Millersville University. Recipient must have a minimum 3.0 GPA and demonstrate superior leadership qualities.

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.

***Philip C. and Karen Ashkar Murley '63 Scholarship.** Awarded to an entering, full-time freshman from Pennsylvania who has chosen to major 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 leadership potential (demonstrated by participation in school and community activities). 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, a GPA of 3.3 or higher and continued participation in university and/or community activities.

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

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.

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

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

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.

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

***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.

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, demonstrates financial need. Renewable in the subsequent year.

***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 scored 1100 or higher on their 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 has maintained a GPA of 3.0.

***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.

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 community, and be in financial need.

Rettew Associates Scholarship in Geology. Awarded to an outstanding student majoring in earth sciences (geology) with a GPA of 3.0 or higher.

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.

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.

***Bernice R. Rydell Scholarship for Excellence.** Awarded as a four year scholarship to an underrepresented student, graduating in the top 10% of 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.

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

Dr. Robert D. and Roma J. Sayre Excellence in American History Scholarship. Awarded to an academically talented rising senior with financial need who is majoring in history, has taken at least three American history courses at the 200 level or above at Millersville, and has excelled in those classes. Criteria to be considered will be grades, scholarship demonstrated through written work, in-service experience and class participation.

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.

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.

Clarence Schock Foundation Scholarship. Four-year scholarships awarded annually to freshman 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.

***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.

***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 the basis of financial need.

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 extra-curricular activity is related to business administration. The scholarship is to be awarded to only one student annually.

***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 providing the student continues to progress in organ study and maintains at least a 3.0 GPA, and remains a music major/minor.

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.

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

***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 maintains good academic standing.

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.

***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.

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.

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.

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

***Steinman Foundations/Intelligencer Printing Freshman Scholarship.** Awarded to a full-time freshman admitted into either the associate or baccalaureate degree programs in industrial technology or technology education with demonstrated interest in graphic communication.

Steinman Foundations/Intelligencer Printing Upperclassman Scholarship. Awarded to a full-time junior or senior industrial technology-graphic communication or technology education major with demonstrated performance in graphic communication and a 3.0 GPA in the major.

***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 student maintains acceptable academic standing.

***Richard W. Stewart Scholarship.** Awarded to an incoming freshman who is the child of an R.R. Donnelly employee (located in Lancaster, Pa.) to attend Millersville University as a full-time undergraduate student in order to achieve a baccalaureate degree. Renewable for six additional semesters providing the student maintains a 2.5 CGPA at the beginning of each academic semester, and is registered for 12 credits per semester.

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.

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

Student Independent Research or Honors College Biology Research Endowment. Awarded to fund biology research expenses of students enrolled in Independent Biology Research and Biology Honors courses (currently Biology 498 and Biology 499) and may include costs to attend, prepare materials for presentation, or travel to conferences helpful to the student's research efforts. The budget may not include a stipend. Candidates must submit a research plan with budget to the Science and Math School Council who will select recipients based on the merits of the proposals. To the greatest degree possible, selected requests will be funded fully. No minimum award is stipulated. The maximum individual award will be 20% of the spendable income. Recipients' expenses will be submitted for payment or reimbursement based on invoices or original receipts.

***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.

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

***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.

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.

***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.

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.

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 CGA of 3.0 or above), who has earned a B or better in CHEMISTRY 326: Biochemistry I and who demonstrates financial need.

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.

Thomas G. Versprille Memorial Scholarship. Awarded to a student in good academic standing who is an active, outstanding sophomore or junior member of the Millersville University cheerleading squad, who has participated in Millersville cheering for at least one year, and is a full-time student with a 2.30 GPA at the time of the award. A member anticipating continued service to the squad is preferred. The scholarship recipient is to be chosen by the cheerleading coach and the director of women's athletics.

Helen Spahr Walker '43 Elementary Education Scholarship. Awarded to an elementary 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 additional years providing the student remains within the major in good academic standing.

Joseph E. Walker American History Scholarship. Awarded to a worthy junior who intends to teach American history on a elementary, secondary, or college level. Secondary consideration is given to a junior history major who excels in American 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 to a student who intends to teach in mathematics, second preference to teach science, third to teach other subjects.

Theodore Weeks APICS —The Educational Society for Resource Management Scholarship. Given by the Lancaster-York Chapter of the American Production and Inventory Control Society to a senior for outstanding achievement in production and operations management.

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.

Wickersham Memorial Scholarship. Awarded to the top ranking junior for excellence of scholarship and exemplary character.

Joan 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.

***Roy Lutz Winters Foreign Language Scholarship.** Awarded to an incoming freshman foreign language major who has an outstanding high school record in foreign languages.

The WLPA - Hall Communications Award. Awarded to a junior student of color and/or a female majoring in communications with an option in broadcasting and who demonstrates a financial need.

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 scholarship.

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 to a female student meeting the criteria. The scholarship may be received more than once.

SCHOLARSHIPS – ATHLETIC

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

***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 athlete who is the child of a Chapman Auto Group employee from either 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 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; upperclassmen are selected based on their previous achievements as members of the wrestling team.

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

***Glenn M. Flegal '54 Wrestling Scholarship.** Awarded to an incoming freshman with a proven wrestling record and who will participate in the MU 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 an MU wrestler.

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

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 exemplifies the best tradition of the scholar-athlete, is in good academic standing with a cumulative grade point average 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 based on financial need.

***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 MU. Students must be full-time, maintain an overall GPA of 3.0 and have passed 24 credits but no more than 60 credits.

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. Recipients 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 freshman who intends to participate in women's intercollegiate athletics, 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.

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

***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.

***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 athlete(s) 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.

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, 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 honors and awards committee through the Office of Development, Duncan Alumni House.

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.

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, a choice from several reference works and journal subscriptions are awarded.

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.

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.

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.

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.

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.

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

Anne E. Beyer Award. Awarded for outstanding performance in student teaching to senior elementary education majors who have spent two full academic years at Millersville preparing to teach in elementary schools.

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.

Henry Franklin Bitner Science Prizes. Awarded to two seniors annually, one in physical science and one in biological science.

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 2.50 and who has demonstrated service to the Millersville campus community through active membership and involvement in campus organizations.

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.

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.

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

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

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

Class of 1898 Award. Awarded to the second-ranking member of the junior class, payable after graduation.

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

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

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

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

Commission on Cultural Diversity Award. Awarded annually to one female and one male student of diverse backgrounds. Selection of the student is based on academic performance and service to the University community.

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

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

Cooperative Education Program Certificate of Achievement. Awarded to seniors for outstanding achievement in the cooperative education program.

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

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

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

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

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

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.

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.

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.

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.

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.

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 on the basis of GPA and recommendations.

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.

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

Sandra Fruitman Art Award. Awarded to an art or art education major who is in good academic standing and who has best demonstrated excellence in the 2-D (two-dimensional) mixed media category.

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

Verda M. Fulmer Award. Established by the Philadelphia Alumni Branch/MU Alumni Association, and awarded to an outstanding senior elementary education major.

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

Roy and Mary Garden Gamber - Helen L. Koontz Award in Elementary Education. Awarded for educational expenses to a junior or senior education major who demonstrates a commitment to a career in teaching. Two awards will be given, at least one must be directed to a candidate committed to teaching elementary 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.

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.

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 year, and who is of high moral character and exemplary habits.

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.

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

Earle M. Hite Award. A plaque awarded to a senior or junior for outstanding service to the University yearbook, the *Touchstone*.

M.R. Hoover Scholarship in Reading. Awarded to one junior with a concentration in reading within the School of Education based upon prior performance within the reading concentration and any extra-curricular activities related to that concentration. Selection is not based upon financial need.

Elsie Hostetter Award. Presented by the early childhood faculty to the outstanding senior early childhood education major.

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

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.

Henry J. Kauffman Award in Metal Technology. Awarded to a senior industry and technology major who has attained distinguished achievement in metals technology.

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

Martin and Anna Zimmerman Kondor Award. Awarded to a graduating elementary education major on the basis of a 3.35 GPA, excellence in student teaching, outstanding personal and professional characteristics and dedication to teaching.

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.

Lancaster-Lebanon Reading Council Award. Awarded to an elementary education major with an area of interest in reading, for outstanding work in reading education.

Edward J. Laucks Memorial Sertoma Award. Awarded to a student who has achieved excellence in the communication major.

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

Music Faculty Award. A bond and recognition on a plaque in Lyte Auditorium to the outstanding music education graduate.

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.

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

Jay B. Niesley '73 Memorial Student Leadership Award. Awarded for outstanding leadership to a student or students with at least 45 completed credits and a GPA of 2.5, and shall be based upon the student's contributions to MU and the potential for future development as a leader. Financial need is not a consideration.

Burl N. Osburn Award. Awarded annually to a student who excels in technology education.

***Pennsylvania Bandmaster's Association Award.** Awarded to an incoming freshman who excels in band instrument performance.

Pennsylvania Institute of Certified Public Accountants Award. A plaque 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.

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

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.

Philadelphia Alumni Award. Awarded to a technology education major who demonstrates the best qualities of a technology teacher.

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.

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

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

Keith Ranck/Ralph and Judy Anttonen / WIXQ Award. Awarded to a student with up to 90 credits passed at the end of the spring semester, who is a member of the WIXQ staff and who has worked at WIXQ for at least one semester and anticipates continuing to work at the station for the duration of the award. The award may be renewed based on continued service and leadership activity.

Margie L. Ranck Award. Awarded to a student who has completed the junior year on the basis of outstanding intellectual attainment and good character.

Dr. Gary W. & 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.

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

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.

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.

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

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

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.

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

Mary R. Slokum Sproul Prize. Awarded to a student for excellence in public speaking.

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.

Drs. George F. & Helen A. '64 Stine Sociology Award. Awarded annually to an outstanding sociology major who has obtained 75 to 90 credits at the time of selection, with a cumulative grade point average in the major of at least 3.0, and an overall grade point average of 2.5.

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.

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.

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

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.

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

John C. Ursprung Award. An engraved silver bowl and award for contributions of high journalistic quality to the University yearbook, the *Touchstone*.

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

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.

The Wall Street Journal Student Achievement Award. A subscription to the economics student submitting the winning essay on an aspect of government and its relation to business.

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.

Who's Who Among Students in American Universities and Colleges. Awarded to outstanding seniors for scholarships, service, constructive participation in activities, and contribution to student government and campus life.

Ruth Fox Wilkinson Award. Awarded by the Philadelphia Alumni Branch/MU Alumni Association to a graduating senior who has attained the highest average in elementary and early childhood education courses.

Dr. Charles R. Winter Award in Pre-Med. Awarded to an upperclassman who is planning to attend medical school.

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

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.

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



Academic Requirements, Opportunities & 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 (51 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 4 years (8 semesters).

Final responsibility for each student's program rests with the student. The role of the adviser 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 (DARS). 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 advisers, and taking into consideration prior knowledge and experience, purposefully select courses in the general education curriculum that meld with required courses, co-curricular and extra-curricular 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:
- in the humanities, students will analyze and interpret existing works of literature and the arts.
 - in the sciences, students will engage in the scientific method, laboratory study, appropriate technology, and mathematics to investigate, evaluate, and apply scientific concepts and theories.
 - in social sciences, students will develop the necessary tools of critical thinking, inquiry, and diplomacy to participate effectively in our democracy and the increasingly complex global society.

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 51 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 advisers 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), 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.

To achieve greater understanding in some disciplines while maintaining breadth of study, exactly two courses within each Liberal Arts area must 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 6 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

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 living/learning community. Students will choose from a number of FYI topics offered each semester. 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.

Approved Wellness course (3 credit). 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 multi-cultural 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 Life-Long 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 required of a student by his/her major and also fulfill that student's general education Perspectives requirement.
4. No perspectives course may be counted within the Critical Thinking across the Liberal Arts component of general education.
5. 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 three credit Perspectives course. This is in addition to any other Open Elective requirements of the student.

Elective(s) [outside of primary major] (3 - 9 credits). Students are required to take at least three credits of Elective courses outside of their primary major. Students who are exempt from the Perspectives requirement and/or did not take or satisfactorily complete a FYI shall take additional Elective credits to satisfy the 12 credit 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: 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 four, 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 are 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 or 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 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 each department office, the early field experiences office, and on the early field experiences 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's 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. Course work completed as part of the first degree program may be used to satisfy the related course work requirement in the second degree.
4. Course work 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 four 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 Western 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 3.0 in the freshman and sophomore years, 3.25 in the junior year, and must have a 3.35 GPA at graduation.

To receive the University Honors baccalaureate, students must:

1. Earn a cumulative GPA of at least 3.35.
2. Earn a minimum of 30 honors credits and fulfill the curricular requirements. Honors credit is awarded only for those honors courses in which a B- or higher is earned.
3. Complete an Honors Independent Study (HNRS 489) and an Honors Senior Thesis (HNRS 499). Criteria are the same as for departmental honors (see section below) with the additional requirement that the thesis should be examined by and defended before a committee that includes a member or former member of the University Honors College Committee and includes an authority from outside the major department.
4. 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.

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 the winter session. For more information about winter session, call the registrar's office at (717) 872-3035, the professional training and education office at (717) 872-3030, 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 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 obtain approval for the proposed topic and faculty supervisor from the department chairperson and school dean before the start of the term.

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 adviser. 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 adviser, 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 9 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. They are available in communications, English, reading and mathematics. Placement in these courses is recommended, and under some circumstances required, following an assessment of 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 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 advisers 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, or
2. Complete a review of academic goals as follows: the student, in consultation with an assigned adviser, must propose and have approved by the adviser each semester, an academic plan of action which 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. A student may 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 are optional 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. This work experience becomes part of the total learning experience, giving the student's academic program a sense of reality and relevance. 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.

The Millersville University student may begin to show his/her interest in the co-op/internship program as early as the first semester, freshman year. Sophomores and juniors (in some instances, seniors, too) 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 the Office of Internships and Civic Engagement Services 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 working professionals. Graduate courses for teachers are available most semesters online, at schools in local school districts, and/or at off-campus locations in Lancaster, York, 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. Courses are scheduled off-campus to assist part-time students and working adult students. For information about off-campus courses, contact the Office of Graduate and Professional Studies, (717) 872-3030.

NONCREDIT COURSES

The Corporate University at Millersville provides customized and training solutions to businesses or community organizations. For information, contact The Corporate University, with offices conveniently located in Millersville and Harrisburg, (717) 871-5957 or corpu@millersville.edu.

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. Student teaching abroad also is available.

Whether fluent in foreign languages or only 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 student exchange programs with London Metropolitan University in London, United Kingdom; University of Strathclyde in Glasgow, Scotland; Saint Mary's University College in Belfast, Northern Ireland; Kansai Gaidai University in Osaka, Japan; Philipps-Universität Marburg, in Marburg, Germany; Pontificia Universidad Católica de Valparaíso in Valparaíso, Chile; Foro Europeo School of Business in Pamplona, Spain; Universidad Pública de Navarra in Pamplona, Spain; Universidad de Burgos in Burgos, Spain; Universidad de Puerto Rico-Mayagüez in Mayagüez, Puerto Rico; University of KwaZulu-Natal in Durban, South Africa; Université de Caen Basse-Normandie in Caen, France; and American Business School Paris in Paris, France. International internship placements as part of a formal study abroad program are possible through the London Metropolitan, Valparaíso, Foro, Marburg and American Business School programs.

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

For more information about study abroad, contact Dr. Kirsten Bookmiller, director of global education and partnerships, Cumberland House, (717) 872-3884 or email globaleducation@millersville.edu.

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 adviser, the department chairperson and the registrar. Approval 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.

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

The Harrisburg Government Internship Semester (HGIS). During each semester of the academic year, Millersville University selects an academically outstanding undergraduate student to participate in the Harrisburg Government Internship Semester Program, sponsored by the Pennsylvania State System of Higher Education. Students selected are placed with policy-makers in the state legislature, executive branch and other governmental agencies. Each intern earns 15 semester hours: 9 semester hours for the internship program, 3 semester hours for a research project, and 3 semester hours for participating in an academic seminar. Allocation of credits to degree requirements are the responsibility of the faculty in the student's major.

To be eligible to apply, a student must have maintained a 3.0 GPA in at least 45 semester hours. Interns are selected from all majors. Contact Dr. Richard Fulmer, Department of Social Work, for application information.

Specialized internships are also available through some academic departments. Some degree programs require internship experiences. For more information, contact department offices.

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. 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 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.

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, nor may a cooperating teacher request a specific student teacher. Student teachers are not assigned to the school district from which they graduated or in which family members are attending or employed.

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 FBI clearance, Act 34 Criminal clearance and an Act 151 Child Abuse clearance that indicate "No record exists" for placement in a student teaching experience. Beginning April 2007, 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.

CERTIFICATION

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

Art
 Biology
 Chemistry
 Citizenship Education
 *Dual Special Education
 Earth Science
 English
 French
 German
 Mathematics
 *Middle Level
 Music
 Physics
 *Pre K-Grade 4
 Social Studies
 Spanish
 Technology Education

*Changes to these programs are anticipated. Please consult with your academic adviser.

MARINE SCIENCE CONSORTIUM

Millersville is the founding member of the Marine Science Consortium; 14 colleges and universities that operate a marine station at Wallops Island, Virginia. The consortium has several seagoing vessels and laboratories with biological and oceanographic equipment. 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 many of the courses offered. For the first round of consideration, applications for these courses must be received by February 1. For more information, contact the School of Science and Mathematics.

SPECIAL EVENTS

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

SPECIAL FUNDS

Samuel Bechtold Stayer and Caroline Nissley Stayer Endowment. Awarded to faculty within the School of Education 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.

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

Brenner Fund. Used for acquisition of materials for the University library.

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 University president or designee.

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.

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.

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.

Frank S. Lisella Endowment for Biology Equipment. Funds to be used by the Biology Department to purchase equipment which 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.

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

Meteorological Endowment. Established in memory of Dr. Russel 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. Funds used to fund an Artist-in-Residence program.

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.

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 School of Education 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.

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.

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

Harold A. 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.

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

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, effective fall 2004.

GRADES AND POLICIES

Schedule Adjustment: Drop/Add. Students may drop or add courses online from the early registration period until the start of the term. Prior to the first day of classes, faculty signatures are not required to drop or add a course, unless faculty permission is specifically required.

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

For the fall and spring terms, a student may drop a course through the end of the first week of classes. Courses dropped will not be entered on the student's record. During the first week of classes, the signature of the course instructor (or their designee) is required to drop a class.

For the fall and spring terms, the "add" period is extended to the seventh class day of the semester. The signature of the course instructor (or their designee) is required to add a course during the first week and two days of classes.

During the summer and winter sessions, the registrar will determine equivalent dates for the no grade, W grade and regular grade periods.

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 first week of classes 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 tenth 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. After the tenth 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 course instructor and adviser) 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 course work 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 course work.

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 next 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 with the approval of the department chairperson and dean of the school offering the course.
- 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 that were recorded in spring 2005 or thereafter. 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-or-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. 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 where 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 adviser, 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 adviser, 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 (6) 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.

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

The registrar determines the academic standing of all students at the end of each semester. Academic standing is based on:

1. The student's cumulative grade point average (CGPA).
2. The total number of credits for which the student has enrolled prior to the review. The review credits also include transfer credits, advanced standing credits and credits for repeated courses. It does not include credits for audited courses.

Students with a CGPA of 2.00 or higher are in satisfactory academic standing. Students with less than satisfactory academic standing are subject to warning, probation or dismissal.

The following procedure applies to all students who do not meet the required minimum CGPA as specified:

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

ACADEMIC PROBATION

When subject to academic probation, the full-time student will be placed on probation for one semester; the part-time student will be on probation for a maximum of 12 credit hours. Such students are not allowed to pre-register for more than 4 courses or 13 credits, whichever is less, in any term, session, or semester unless they have the written permission of the adviser, chair, head of academic advisement or appropriate designee.

A student on probation will return to satisfactory academic standing at the end of the semester in which he/she earns a 2.00 cumulative grade point average (CGPA).

ACADEMIC DISMISSAL

The student on academic dismissal for the first time will not be able to register for or attend classes at the University for one semester. The student on academic dismissal for the second time will not be able to register for or attend classes for two semesters. The third time a student is dismissed from the University, the student will be dismissed for at least 3 years, and after that time, only special cases for readmission will be considered by the Academic Standards Committee.

Students who have been dismissed may not register for courses offered during winter session, summer sessions, or for courses offered by the University on the web, or at off-campus locations.

Dismissed students who wish to re-enter the University must apply for readmission through the admissions office.

A student will *not* be dismissed for academic reasons in any semester that he/she has:

1. Been in good academic standing (i.e., not on probation,) or
2. Earned a 2.00 or higher semester GPA.

Students subject to dismissal who have earned a 2.00 or higher semester average will be continued on academic probation until their CGPA is at least 2.00.

APPEALS

Students who have been dismissed and believe specific, unusual circumstances affected their academic performance may request a review by writing a letter of appeal to the Academic Standards Committee in care of the registrar's office and may request a personal interview before the committee.

For the appeal to be considered before the next semester, it must be received by the committee by the date specified in the notice of dismissal.

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 higher 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 adviser 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.

Students enrolled for more than 18 credits are charged additional tuition.

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.

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 course work, 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 School and monitored by the School Dean. A student may discuss issues related to these standards with the School Dean. The School 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 Schools establish the programmatic standards for their respective schools and will review any issues related to those standards. The following procedures must be followed by students challenging these academic determinations or when they encounter 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 thirty (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 ten (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 ten (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 School Dean within ten (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 School Dean will request a written statement from the faculty member and may meet with the faculty member as well. The School Dean will review the appeal and any supporting documentation and will meet with the student. The School Dean will notify the student, the Department Chair, and the faculty member of his or her decision within ten (10) calendar days of receipt of the appeal. The decision of the School 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 (i.e. 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 division of Academic Affairs 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 ten (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 ten (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 ten (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:

1. 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.
2. The University policy is that faculty will excuse absences for the following reasons:
 - a. personal illness,
 - b. death or critical illness in the family,
 - c. participation in a University-sponsored activity,
 - d. jury duty,
 - e. military duties, or
 - f. religious holidays.
3. 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.
4. 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, Experimental courses.

479, 579, 679

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:

1. Earned a semester GPA of 3.50 or higher, and;
2. Attempted at least 12 credits of undergraduate course work, excluding those courses not used to compute the GPA.

GRADUATION HONORS FOR A BACCALAUREATE DEGREE

Effective with December 2009 graduation. Students who have earned consistently superior grades in their course work 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 course work.

Students who are completing a second baccalaureate degree program at Millersville are not eligible for graduation honor.

Graduation Honors for Associate's 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 course work.



Campus Life

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.

ACADEMIC ADVISEMENT

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. Advisers 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 adviser. Students in majors have a faculty member from their department as an academic adviser. Students in the nationally recognized Exploratory Program have a specially trained adviser who may be a faculty, staff member or administrator at Millersville. Students in the AIM for Success program are assigned advisers during their freshman year from the program.

Advisers 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 adviser for completing degree requirements and meeting with their adviser on a regular basis to discuss their academic and career plans and questions.

The Office of Academic Advisement 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

The Office of Career Services, located in Lyle Hall, offers 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 career services office assists students/alumni with these important activities.

Career counseling, computer-assisted career guidance, current information on hundreds of occupations, and videos describing Millersville majors are available to students starting with their freshman year.

Interactive programs help students:

- Identify their interest, 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 majors.

All undecided majors or students who are not certain about their present major are encouraged to participate in this program.

Instructional workshops and videos on resumé writing, interviewing, and job search strategies are available to students and alumni.

On-campus interviews with employers, job vacancy announcements, graduate school information, resumé referrals, job fairs, and library resources to research potential employers are available. During fall and spring semesters, the career services office hours are 8 a.m.- 6 p.m. Monday through Thursday, and 8 a.m.- 5 p.m. on Friday. A counselor is available to answer general questions and critique resumé daily from 11 a.m.-1 p.m.

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, and consultations are available. Alcohol and other drug counseling is available, and provided by a Certified Addiction Counselor. *Counseling services are strictly confidential.*

HEALTH SERVICES

University Health Services seeks to promote good health among students through education, diagnostic and treatment programs. A wide range of patient services are available including medical exams, screening tests, treatment of acute and chronic illnesses, and referral to other medical personnel and services.

Health Services is staffed by licensed and experienced physicians, nurse practitioners and registered nurses. The facility is well equipped for routine outpatient care and limited inpatient care for students who require more medical attention but not hospitalization.

A physical examination form must be completed by your medical provider before matriculation. This will include a TB test (Mantoux), a detailed review of your immunization record, and information regarding your insurance coverage. This information must be on file in order to use health services. Brochures are available with specific information about the services offered.

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/mmap.

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 full-time students admitted to Millersville and is tailored to student needs. The scope and format depends on the semester in which the student plans to enroll and usually includes diversity workshops, meetings with University officials, advisement, registration for first semester classes, and opportunities to meet other students and experience the college environment.

PRE-PROFESSIONAL ADVISEMENT

Pre-professional advisement is available to students contemplating a professional post-baccalaureate program 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 multi-disciplinary faculty panel advises students interested in attending schools of allopathic medicine (M.D.), osteopathic medicine, 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 adviser in the department of their major, if possible. These advisers 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 and 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 the 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 and adult student, see the section on *Admission to Millersville University*. For more information on services for adult students, contact the Office of Graduate and Professional Studies at profdev@millersville.edu or call (717) 872-3030.

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.

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 and at the information desk, Dilworth Building. www.millersville.edu/shuttlebus.

SOCIAL EQUITY & DIVERSITY

The Office of Social Equity & Diversity plays a vital role as advocate for equality and diversity on campus, identifying people with needs and providing resources by:

- Encouraging a campus free of harassment and discrimination by giving serious attention to complaints of this nature and fact finding the specific situation or incident.
- Serving as certified mediators to faculty, staff and students by providing opportunities for discussion and conflict resolution.
- Undertaking the initial fact finding and case preparation for Millersville University legal counsel in legal challenges that allege discriminatory practices.

Millersville University expects all its members—students, faculty and staff—to respect the rights, dignity and worth of others. The University's policy of nondiscrimination extends to all phases of campus life.

Members of the University community who feel their individual rights have been violated or the policy of nondiscrimination has been abridged, should address their concern to Patricia Hopson-Shelton, Assistant to the President for Social Equity & Diversity, Delaware House. Questions or complaints regarding discrimination and sexual harassment should also be addressed to the Office of Social Equity & Diversity.

TUTORIAL SERVICES

Tutoring is available through the Millersville University Tutoring Center, a division of the Office of Learning Services, in the following areas: departments in the School of Education, departments in the School of Humanities and Social Sciences, the School of Science and Mathematics (math tutoring available only for students with disabilities, all other students should seek math tutoring directly through the Math Assistance Center), and Aim for Success Program/Act 101 students.

UNIVERSITY DINING SERVICES

Millersville operates a comprehensive dining services program for students and guests of the University. All students are eligible to participate in the dining program. Students who reside in the residence halls and 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 halls are located at the Upper Deck in Gordinier Hall and the North Side Bistro in Lyle Hall. Students and guests may dine at these locations as well as the Galley located in the Student Memorial Center (SMC). In addition, dining opportunities are available at the following retail operations: the Club de'Ville in the SMC, the Ganser Grind Coffee Shop in the library, Gordy's convenience store and Turkey Hill Creamery in Gordinier Hall, the deli-convenience store at The Cove in Lyle Hall and The Cyber Café at Caputo Hall.

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.

Services also include proctoring examinations for courses taken at other institutions and for individuals seeking to meet professional licensing or certification requirements.

For a full description of services and test schedules, contact the University Test Center, Lyle Hall, or www.millersville.edu/gps for the latest information.

WELLNESS AND WOMEN'S PROGRAMS

The Elsie S. Shenk Wellness and Women's Program provides a variety of services and programs to the Millersville University community. The program is housed in Montour House and consists of the Wellness Center, including the peer health educators, and the Women's Center, including the empower peer educators.

Wellness center activities focus on programs that will encourage students to make positive choices for a healthy lifestyle. Some events include; Wellness Fair, Alcohol Awareness Week, and "Smash the Butt" 5K Race. Keep an eye out for *Stall Talk* in campus restrooms!

The Women's Center creates a supportive climate that encourages the professional and personal growth of women and is devoted to providing a place where women and men can gather to discuss gender issues. Events include: Sexual Assault Awareness Month, Take Back the Night and Love Your Body Day.

Peer educators provide workshops for other students, as well as local schools, and various community groups. Workshops cover a wide variety of topics including stress management, alcohol, HIV/AIDS and STI prevention, sexual assault and dating violence. The Wellness and Women's Center has brochures available on various lifestyle issues, a video collection for in-house viewing, as well as free safer sex kits.

COMMUNITY SERVICE

The Volunteer Central, located in the Internship and Civic Engagement Services office, engages students in worthwhile service activities both on and off campus.

On-campus programs include: The Second Mile, a mentoring program matching school-aged children with college friends for monthly events; Into the Streets, a full day of service each spring; and Empty Bowls, an awareness and fund raising event benefiting local hunger organizations.

Off campus, the community service office works with hundreds of nonprofit organizations in Lancaster and York counties to offer rewarding and often challenging service experiences. Students may volunteer at a transitional living center, health clinic, animal shelter, day care center, museum, library, or other organization to explore career options, gain work experience, or give to 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 assisting at the Boys and Girls Clubs. Van transportation is provided from the University to several sites; many organizations are located on public bus routes.

For more information go to www.millersville.edu/elcm.

STUDENT HOUSING

ON-CAMPUS HOUSING

Millersville has nine residence halls offering a variety of housing lifestyles: coeducational and special interest theme areas. Each residence hall is staffed by a graduate assistant, 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 excursions to off-campus cultural, athletic, and recreational sites are offered throughout the year.

Millersville University firmly believes that residence hall living is beneficial for the academic adjustment 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 attempted 60 credit hours or they have completed four regular (fall or spring) semesters, whichever comes first.

In addition, the University normally makes exceptions to the residence hall requirement for full-time students who are:

- Commuting from the home where they live with their parent(s) or a member of their immediate family who is at least 21 years old, provided the one-way commuting distance does not exceed 40 miles. The University requires written verification of a student's commuting status from the parent(s)/immediate family member(s). *NOTE: A Request to Change to Commuter Status form is available in the Office of Housing and Residential Programs.*
- 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.

Limited on-campus housing is available for students entering his/her third year at Millersville University. Questions regarding this policy and requests for exceptions to it should be directed to the director of housing and residential programs. Details of residence hall policies and procedures are in the *Living On Campus Handbook*, available from the Office of Housing and Residential Programs, Harbold Hall.

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 off-campus life 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 off-campus life 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 is achieved.

STUDENT ACTIVITIES

Millersville University believes that the lifelong benefits of a college education are not derived solely from the classroom. One of the University's priorities is, therefore, to develop the full potential of its students and in so doing to 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 130 organizations on campus. Students whose particular interests are not represented by an existing organization may establish a new club by following procedures in the Student Senate Constitution.

Many student activities are funded by student activity fees. Allocations to over 60 organizations and programs are decided by the allocations committee of the Student Senate, with approval of the full senate and the University president.

For a complete listing of all student organizations, see the *Student Handbook* available at www.millersville.edu/~handbook.

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 play in NCAA Division II with the exception of wrestling (Division I). Two full-time certified athletic trainers and student trainers serve all intercollegiate teams.

Men's programs are available in baseball, basketball, cross-country, football, golf, soccer, tennis, track and wrestling. Women's programs are available in basketball, cross-country, field hockey, lacrosse, soccer, softball, swimming, tennis, track and field, 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 and volleyball.

Club Sports. Club sports offer organized, non-varsity competition and recreational activities. Club sports currently active on campus include cycling, dance, bowling, ultimate frisbee, fencing, ice hockey, martial arts, men's lacrosse, men's volleyball, roller hockey, rugby, synchronized swimming and water polo.

Recreational Activities. Millersville's gymnasium and swimming pools are open for recreation at scheduled hours. For more information contact the director of intramurals and recreation in Pucillo Gymnasium.

Athletic and Recreational Facilities. Millersville's facilities include three gymnasiums, two swimming pools, two racquetball courts, several weight training facilities, outdoor tennis and basketball courts, lighted multipurpose synthetic turf stadium and practice field, and 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 outlets to relieve the stress of academic life.

The main entrance lobby area contains an information desk that provides building information and campus activities. Various newspapers and a wide selection of magazines are available to borrow for reading anywhere in the building.

The SMC has nine furnished conference rooms. These rooms are widely used for weekly meetings, guest speakers and a variety of other events. The Reighard Multipurpose Room provides seating for approximately 500, and is used for film series, lectures, parties, fashion shows and dances. Reservations for conference rooms and the multipurpose room may be made at the information desk.

The banking center is located on the main level of the SMC. This area houses the banking services for registered student organizations, auditing services for student organizations and acts as the campus ticket outlet. Monthly local bus passes may be purchased and personal checks up to \$50.00 may be cashed with a valid Millersville University I.D. card.

The Galley, a spacious dining area, is located in the SMC and provides students, faculty, staff and visitors with an extensive menu. On the balcony overlooking the Galley are student organization offices. Currently the Student Senate, Allies, University Activities Board, Black Student Union, Society of Latino Affairs and the International Relations Club have offices there. A computer lab across from the Galley is equipped with both PCs and MACs and is open during regular SMC hours.

The lower level of the SMC contains offices for *The Snapper* (student newspaper), *Touchstone* (student yearbook), and WIXQ (campus radio station). The Club de 'Ville is also located on the lower level. This coffeehouse environment provides a comfortable location to surf the Internet, or have lunch or a cup of Starbucks™ coffee. Frequent events include comedians, poetry slams, and Monday night football gatherings. On Friday and Saturday nights, the club turns into 'Ville After Dark, a programming alternative that includes crafts, entertainment, movies, and a midnight breakfast buffet (Saturday only).

A fitness wing is located at the south end of the SMC. It consists of a fitness center with two circuits of selectorized weight training equipment, plate-loading free weight equipment and a wide range of cardiovascular equipment. Four racquetball courts can be reserved for wallyball and racquetball play. The fitness wing is also home to aerobics classes and an open recreation area where members can participate in various types of athletic activities.

The University Store is located in the north end of the Student Memorial Center. The upper level contains an extensive selection of general interest books in an attractive setting. A large selection of imprinted campus wear, as well as classroom supplies and art supplies are kept in stock. Computer software and accessories may also be purchased. In addition, various types of cards, posters and electronic items are available. The lower level of the University Store includes the textbook department and a full service copy shop.

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 GOVERNMENT

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 student government is to encourage students to participate in sound governmental procedures and develop innovative and creative University programs.

Students participate in University governance through the 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 the board of directors of Student Services, Inc. Five student consultants serve on the Faculty Senate 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, *Touchstone*, *George Street Carnival*, MUTV 99 and WIXQ-FM are the five 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.

Touchstone, the University yearbook, serves as a record of University activities and personalities.

George Street Carnival is a literary magazine featuring student poetry, essays, short stories, art work and photography.

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.

MUSICAL GROUPS

A number of musical groups are open by audition to all University students. These groups include the Marauder Marching Band, the University Choir, the University Orchestra, the Symphonic Band, the Mixed Chorus, the Gospel Choir, the Jazz Ensemble and numerous small ensembles.

SPECIAL INTEREST CLUBS

Special interest clubs provide students with pre-professional activities. Accounting, art, English, dramatics, graphics, history and the human-powered submarine are some of the interests represented by clubs. Clubs that focus on social, political or environmental issues are also available.

FRATERNITIES AND SORORITIES

Millersville has nearly 20 Greek letter organizations, including national, local, and historically African- American fraternities and sororities, which offer something unique to each of their members. Greek Life at Millersville is full of great opportunities to meet people, develop leadership skills, give back to the community and prepare students for life after college. Members of the Greek community also benefit from the Armstrong House, also known as the Greek House, where members of the Greek community gather to study, hold meetings and host social events.

RELIGIOUS LIFE

Millersville University encourages students to maintain an interest in and devotion to their religious faith. Several religious organizations offer religious, social and cultural programming including: United Campus Ministry, Bible Campus Ministry, Hillel, Intersarsity Christian Fellowship, John Newman Association (Roman Catholic), University Christian Fellowship, Reformed University Fellowship and Athletes Bible Fellowship. Although not members of the University staff, Roman Catholic and Protestant ministers are employed by Catholic Campus Ministry, United Campus Ministry and University Christian Fellowship to serve the University. Both Roman Catholic and Protestant services are conducted on campus.

Millersville area churches welcome students to their services; several sponsor programming specifically for students. Students who do not find the church of their preference in Millersville will find many places of worship 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.

SPECIAL EDUCATIONAL FACILITIES

FOREIGN LANGUAGE MEDIA CENTER

The foreign language media center in McComsey Hall includes the instructional digital language lab (Tandberg Prisma Multimedia Learning Center) 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, Latin, Russian, and Spanish. The media center is also connected to several satellite receivers, and both live and delayed newscasts are available in foreign languages.

GANSER LIBRARY

The present library building opened in 1967 and was named for Helen A. Ganser, head librarian from 1911 to 1952. The library faculty and staff have organized a varied collection of materials, and encourage all members of the University community, as well as interested community residents, to use its facilities and services. The library houses approximately a half million books and provides access to over 10,000 periodical titles. Circulation policy information, as well as information about other library policies and services, is accessible from the library's website, through links via the University home page.

Ganser Library is a member of the Federal Depository Library Program (FDLP), the American public's primary source of free access to federal government information. Administered by the Government Printing Office (GPO), the FDLP provides for the distribution of U.S. government publications to a network of more than 1,300 public, academic, law, Federal and other libraries in virtually every congressional district. The library catalog and website provide access to government publications in the collection, including online electronic documents, monographic and serial documents, maps, microfiche, and CD-ROMs. The library is also a depository for the Commonwealth of Pennsylvania.

The Curriculum Materials Center provides access to current K-12 materials for teacher education students and others. These include textbook series, activity guides, kits and games, manipulatives, educational software, and audio/visual materials such as videocassettes. The curriculum center also houses the Millersville Math & Science Teacher's Center, home to teaching materials for inquiry-based lessons in math and science. The center adjoins a large collection of current and classic children's literature.

The University Archives and Special Collections is a repository for historic documents and records focused on the University, as well as local and regional history. Unique documents and records which have enduring research value are identified, selected, organized and preserved. Collections include the University archives, the manuscript collection, the local history and culture collection, and

the rare book collection. Of particular interest are the Carl Van Vechten Collection, which contains significant historical photographs documenting African-American history; the Margaret Woodbridge Collection, focusing on the works of 20th century British and American women authors; and the Wickersham Pedagogical Collection, which documents 19th century educational practice in the United States.

In fulfillment of the library's role as the learning resource center of the University, library faculty provide workshops and instruction in information literacy skills for faculty, staff, and students. Instruction is also provided through the world wide web for asynchronous learning. Scholarly research is further supported by a comprehensive and well-developed library collection that is continuously being augmented by the most current and up-to-date resources available, both in print and electronic format.

The library belongs to several state wide and regional library consortia. These consortia allow for resource sharing, reciprocal borrowing, and collaborative purchasing of resources. Most notably, the Keystone Library Network and the Pennsylvania Academic Library Consortium provide members of the Millersville University community with access to dozens of electronic information resources, as well as direct access to the library catalogs of the libraries within the State System of Higher Education and over 50 other academic libraries. Many of these electronic resources, as well as the Millersville University library catalog, are accessible via the library link on the University home page.

INDUSTRY & TECHNOLOGY FACILITIES

Osburn Hall is devoted exclusively to the Department of Industry & Technology, providing classrooms, laboratories, offices, and other spaces that support the industrial technology, technology education, and occupational safety and environmental health programs.

During 2004, Osburn Hall completed a total life-cycle renovation and a 19,000-square-foot, two-wing expansion, 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 control 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, a general technology laboratory and modular technology classroom 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 software, nanofabrication microscopes, computer-controlled machining (CNC), materials testing, an automated manufacturing center, robots, programmable logic controllers, digital electronics, desktop publishing, multimedia development and instruction, multi-color printing, laser technology, fluid power, noise dosimeters, and safety engineering training modules. Osburn Hall has direct 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

The Division of 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 computer workshops relating to software products, maintenance and support for classroom technology, documentation and how-to instructional materials, assistance in statistical analysis of data, file conversions and transfers between different computing platforms and advice on purchasing decisions.

Over a dozen general purpose and specialized computer laboratories located throughout the campus, housing more than 475 workstations, provide students with convenient access to the University network, email and the Internet. These labs are multimedia-capable and some may be used by faculty as technology classrooms to enhance the student's learning experience. The labs are available during daytime and evening hours. General purpose labs in Ganser Library are often open 24 hours a day during the week and provide extensive hours of availability over the weekends.

Wireless access to the internet is available throughout the campus except in residential halls. Planning has begun to extend wireless access capabilities to those buildings as well.

Every room in every residence hall has an Internet connection for every occupant providing residents with continuous access. Information Technology, through SafetyNet, provides technical assistance and advice for connectivity and students' personal computers.

Assistance for any type of technology question is provided by the Help Desk. The Help Desk, located on the first floor of the Boyer Building, with its entrance on the Frederick Street side, provides weekday and extensive weekend telephone support for hardware or software questions. Walk-in support is available weekdays from 8 a.m. until 10 p.m. and enables faculty and students to receive personalized attention and provides access to the Help Desk's technical resource center of manuals, training documents and videos.

For complete details about information technology staff, services provided, equipment in labs, lab schedules and many more facts, visit the Millersville University home page, www.millersville.edu and click on information technology, or phone (717) 872-3341.

INTERNET/NETWORK ACCESS

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 my'Ville account and email account upon admis-

sion to the University. my'Ville is the student portal to the University's computing and networking systems - their access point to Millersville University's online services. Residence hall students must have a valid my'Ville account to access the Internet from their dorm room. This is also true for all students using computers in the various computer labs around campus. Network and internet usage are also governed by the Millersville University Policy for Responsible Use of Electronic Resources.

SCIENCE & MATHEMATICS FACILITIES

The Millersville University Argires Complex includes the 88,000-square-foot Caputo Hall, 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 statistical software package. Wickersham also has student study areas, a conference room, dedicated space for mathematics tutoring, eight classrooms, and was completely renovated during 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, atomic force microscope, scanning electron microscope, several types of spectrophotometers (FT infrared, visible-ultraviolet and 400 MHZ FT nuclear magnetic resonance), differential scanning calorimeter/thermogravimetric analyzer, gas chromatograph/mass spectrometer, Raman Spectrometer, a scintillation counter, phase contrast microscopes, optical bench components, a vibration-isolating table for holography and optical interferometry, a cryogenics unit, eximer laser, x-ray spectrometer, cosmic ray muon detector, electrophoresis equipment, thermocyclers, ultramicrotomes, high speed and table-top centrifuges and microfuges, laminar flow hoods, CO2 incubators for tissue culture, ultra-low 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, backpack electroshocker, PIT tagging equipment, active infrared monitors, fluorometer, digital cameras, video cameras, turbidity meters and 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.

The meteorology program is supported by a large number of networked workstations, in three teaching laboratories, two research labs, and a state-of-the-art weather center. Equipment for acquisition and display of satellite imagery and other meteorological data is available, including a micro-pulse Lidar, a Sodar and a sun-tracking photometer as are standard instruments for making weather observations. A tethered atmospheric sounding system and instrument trailer is used for fieldwork in meteorology. Four teaching labs, including a fully equipped soil mechanics laboratory, support the geology program. Geological field equipment includes a surveyor's total station, a proton magnetometer, and a 12-channel engineering seismograph. Roddy Hall houses an earthquake seismograph station. The oceanography program is supported by one on-campus lab, which includes a wave tank, and the field station of the Marine Science Consortium, Wallops Island, Virginia, including access to a modern research vessel.

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 the 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 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.

Millersville University students residing in campus housing who have less than 30 credits, who are less than 21 years of age, are generally not permitted to have vehicles on campus. Students covered by this restriction MAY be permitted to register a vehicle on a semester basis if they can demonstrate a compelling need due to medical, military, and educational circumstances. All resident parking spaces not sold by the end of the first week of each semester will be made available to all resident students by means of a lottery. Upperclassmen resident students who fail to purchase a permit as required will become part of the lottery pool.

PRIVACY OF STUDENT RECORDS

The Family Educational Rights and Privacy Act of 1974 was amended 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 non-consensual disclosure may be made.

Millersville's policy on the confidentiality of student records is available from the vice president for student affairs, Washington House. 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.

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, 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) that are unauthorized.

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 class work.

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 any uncertainties ahead of time.
- 4) Don't look in the direction of other student's 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 (1) 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

UNDERGRADUATE PROGRAMS

Millersville offers 51 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 three 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 & OPTIONS	DEPARTMENT
Allied Health Technology B.S.	Biology
Medical Technology (Clinical Laboratory Science)	
Nuclear Medicine Technology	
Pre-Athletic Training	
Respiratory Therapy	
Anthropology B.A.	Sociology-
Archeology	Anthropology
Art B.A.	Art
Art B.F.A.	Art
*Art Education B.S. Ed. (PreK-12)	Art
Biology B.A.	Biology
Biology B.S.	Biology
Botany	
Environmental Biology	
Marine Biology	
Medical Technology (Clinical Laboratory Science)	
Molecular Biology/Biotechnology	
Nuclear Medicine Technology	
Pre-Athletic Training	
Pre-Optometry	
Pre-Podiatry	
Respiratory Therapy	
*Biology B.S.Ed. (7-12)	Biology
Business Administration B.S.	Business Admin.
Accounting	
Finance	
International Business Management	
Marketing	
Chemistry B.A.	Chemistry
Cooperative Engineering	
Chemistry B.S.	Chemistry
Biochemistry	
Environmental Chemistry	
Nanotechnology	
Polymer Chemistry	
*Chemistry B.S. Ed. (7-12)	Chemistry
Computer Science B.S.	Computer Science
Early Childhood B.S.Ed. (PreK-4)	Elementary & Early Childhood
Earth Sciences B.A.	Earth Sciences
Environmental Geology	
*Earth Sciences B.S.Ed. (7-12)	Earth Sciences
Economics B.A.	Economics
Financial Economics	
Political Economy	
Quantitative	
Economics B.A.	Economics
Financial Economics	
Political Economy	
Quantitative	

* Changes to the certifications and the certification programs are anticipated at the direction of the Pennsylvania Department of Education.

BACCALAUREATE DEGREES & OPTIONS	DEPARTMENT
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 Film Studies Linguistics Print Journalism Writing Studies	English
French B.A. International Business	Foreign Languages
*French B.S. Ed. (7-12) International Business	Foreign Languages
Geography B.A. Environmental Studies Geospatial Applications Global Studies	Geography
Geology B.S.	Earth Sciences
German B.A. International Business	Foreign Languages
*German B.S. Ed. (7-12) International Business	Foreign Languages
Gov't & Political Affairs B.A.	Gov't & Political Affairs
History B.A.	History
Industrial Technology B.S. Computer Aided Drafting/Design Construction Technology Electronics/Control Systems General Industrial Technology Graphic Communications Manufacturing Technology Mechanical Technology Nanofabrication Manufacturing	Industry & Technology
International Studies B.A.	(Multi-disciplinary)
Mathematics B.A. Actuarial Science Statistics	Mathematics
Mathematics B.S. Actuarial Science Applied Mathematics Statistics	Mathematics
*Mathematics B.S.Ed. (7-12) Actuarial Science Statistics	Mathematics
Meteorology B.S.	Earth Sciences
Middle Level Education B.S.Ed. in Education (Grades 4-8)	Elementary and Early Childhood Ed.
Music B.A. Music Business and Technologies	Music
*Music Education B.S.Ed. (PreK-12)	Music
Nursing B.S.N.	Nursing
Occupational Safety & Environmental Health B.S.	Industry & Technology
Ocean Sciences & Coastal Studies B.S. Physical Oceanography	Earth Sciences

* Changes to the certifications and the certification programs are anticipated at the direction of the Pennsylvania Department of Education.

BACCALAUREATE DEGREES & OPTIONS	DEPARTMENT
Philosophy B.A.	Philosophy
Physics B.A.	Physics
Computer Science	
Cooperative Engineering	
Meteorology	
Nanotechnology	
Philosophy	
Polymer Chemistry	
Physics B.S.	Physics
*Physics B.S.Ed. (7-12)	Physics
Psychology B.A.	Psychology
*Social Studies B.S.Ed. (7-12)	(Multi-disciplinary)
Social Work B.A.	Social Work
Sociology B.A.	Sociology/ Anthropology
Criminology	
Spanish B.A.	Foreign Languages
International Business	
*Spanish B.S.Ed. (7-12)	Foreign Languages
International Business	
*Special Education and Early Childhood Educ. (Dual) B.S.Ed. in Education	Special Education
Speech Communication B.S.	Communication & Theatre
Broadcasting	
Communication Studies	
Public Relations	
Theatre	
*Technology Education B.S.Ed. (PreK-12)	Industry & Technology

ASSOCIATE DEGREES & OPTIONS	DEPARTMENT
Chemistry A.S.	Chemistry
Pre-Pharmacy	
Computer Science A.S.	Computer Science
Industrial Technology A.T.	Industry & Technology
Computer Aided Drafting/Design	
Construction Technology	
Electronics/Control Systems	
Graphic Communications	
Manufacturing Technology/Mechanical Technology	
Nanofabrication Manufacturing	
Occupational Safety & Environmental Health	

MINORS & OPTIONS	DEPARTMENT
African-American Studies	(Multi-disciplinary)
Anthropology	Sociology/ Anthropology
Archeology	
Cultural Anthropology	
General Anthropology	
Art	Art
Art History	
Studio Art	
Athletic Coaching	Wellness & Sport Sciences
Biochemistry	Chemistry
Biology	Biology
Business Administration	Business Admin.
Accounting	
Finance	
General Business	
Management	
Marketing	

MINORS & OPTIONS	DEPARTMENT
Chemistry	Chemistry
Computer Science	Computer Science
Criminology	Sociology/Anthropology
Earth Sciences	Earth Sciences
Economics	Economics
Technical	
Environmental	(Multi-disciplinary)
Environmental Policy and Regulation	
Industrial and Environmental Health	
Land Use	
Quantitative Methods in Environmental Science	
Water Resources	
Environmental Chemistry	Chemistry
Environmental Hazards and Emergency Management	(Multi-disciplinary)
English	English
American Literature	
British Literature	
Film Studies	
General English	
Linguistics	
Print Media Studies	
Writing	
French	Foreign Languages
Geography	Geography
Environmental Geography	
General Geography	
Geospatial Applications	
Global Geography	
Geology	Earth Sciences
German	Foreign Languages
Gerontology	(Multi-disciplinary)
Government & Political Affairs	Gov't & Political Affairs
Greek	Foreign Languages
History	History
Industrial Technology	Industry & Technology
Computer Aided Drafting/Design	
Construction Technology	
Electronics/Control Systems	
General Industrial Technology	
Graphic Communications	
Manufacturing Technology	
Mechanical Technology	
International Studies	(Multi-disciplinary)
Latin	Foreign Languages
Latino/a Studies	(Multi-disciplinary)
Mathematics	Mathematics
Meteorology	Earth Sciences
Molecular Biology	Biology
Music	Music
Oceanography	Earth Sciences
Occupational Safety & Environmental Health	Industry & Technology
Philosophy	Philosophy
Physics	Physics
Psychology	Psychology
Sociology	Sociology/ Anthropology
Spanish	Foreign Languages
Statistics	Mathematics
Theatre	Communication & Theatre
Women's Studies	(Multi-disciplinary)

GRADUATE PROGRAMS

Millersville offers 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	DEPARTMENT
Art Education M.Ed.	Art
Biology M.S.	Biology
Business Administration M.B.A.	Business Administration
Early Childhood Ed. M.Ed.	Elementary & Early Childhood Education
Elementary Education M.Ed.	Elementary & Early Childhood Education
Emergency Management M.S.	(Multi-disciplinary)
English M.A. and M.Ed.	English
French M.A. and M.Ed.	Foreign Languages
German M.A. and M.Ed.	Foreign Languages
Gifted Education. M.Ed.	Elementary & Early Childhood Education
History M.A.	History
Language and Literacy Education M.Ed.	Elementary & Early Childhood Education
Leadership for Teaching and Learning M.Ed.	Educational Foundations
Mathematics M.Ed.	Mathematics
Nursing M.S.N.	Nursing
Family Nurse Practitioner Nursing Education	
Psychology	Psychology
School Counseling M.Ed.	
Clinical Psychology M.S.	
School Psychology M.S.	
Social Work M.S.W.	Social Work
Spanish M.A. and M.Ed.	Foreign Languages
Special Education M.Ed.	Special Education
Sport Management M.Ed.	Wellness & Sport Sciences
Athletic Coaching	
Athletic Management	
Technology Education M.Ed.	Industry & Technology

POST-BACCALAUREATE AND POST-MASTER'S CERTIFICATION AND CERTIFICATE PROGRAMS

Instructional Certification:

Art
 Biology
 Chemistry
 Early Childhood Education
 Earth Sciences
 English
 French
 German
 Mathematics
 Music
 Physics
 Program Specialist-ESL
 Reading Specialist (*requires Instructional II Certification*)
 Social Studies/Citizenship Education
 Spanish
 Technology Education

Post-Baccalaureate Certification/Educational Specialist:
 School Nurse

Post-Master's Certification/Educational Specialist:

School Psychology
Secondary School Counseling
Elementary School Counseling

Post-Master's Certification/Administrative:

Principal Certification K-12

Supervisory Certification Programs:

Art Education
Communication Arts (*English*)
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
Technology Education

Post-Master's Certificate:

Family Nurse Practitioner
Nursing Education

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 in. . .” 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.

DISTANCE LEARNING FORMATS:

Online: Millersville University defines an online course as one that meets completely online via online courseware system (i.e. Blackboard.)

Videoconference: Millersville University defines a videoconference course as one that meets in a classroom with two-way video capabilities. The course may also require online assignment/meetings.

Blended: Millersville University defines a blended course as one that requires some face-to-face class meetings along with some classes offered via distance education-either via online, videoconferencing or independent study.

ACCOUNTING

See Business Administration

ACTUARIAL SCIENCE

See Mathematics

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, communications and 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 must be at the 300 level or above.

COURSE DESCRIPTIONS

AFAM 201: 3 s.h.

Introduction to African-American Studies (G3)

Provides an overview of African-American culture and history. African-American perspectives and contributions in the areas of literature, art, theater, 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. Prereq: AFAM 201.

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. Prereq: AFAM 201.

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.

Afro-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 (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 263 (designated sections by exception): 3 s.h.

Popular Music (G1)

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

ARMY: MILITARY SCIENCE (ROTC)

Reserve Officers Training Corps

Professor Eckstein, Instructor Hilty

Participation in military science courses during the freshman and sophomore years is open to all students. Individuals who elect to continue in and successfully complete the program during their junior and senior years can receive a commission as a second lieutenant in the U.S. Army, National Guard or Army Reserves upon graduation. They will be required to serve from four months to four years in the active Army, depending upon the type of commission.

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. To complement their investigation of military history, students will receive practical instruction in the application of military art and basic soldier skills. Meets one hour per week.

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.

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 the 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. Prereq: Open only to advanced course cadets.

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 each semester. Prereq: Open only to advanced course cadets.

ART

School of Humanities and Social Sciences

Assistant Professor Cunningham, chairperson.

Professor Robinson, co-chairperson.

Professors Andriulli, Kerlavage.

Associate Professors Bensur, Frischkorn, Mata, Schuller, Sigel.

Assistant Professors Bruntse, Miller, Pannafino, Wolf.

All courses are available to students enrolled in any art curriculum.

The Department of Art 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 adviser, assumes much of the responsibility for determining their program of study.

B.A. and B.F.A. art students must maintain a minimum grade average of 2.0 in their major, while B.S.Ed. students must maintain a minimum GPA of 3.0 overall. A portfolio review is mandatory at the end of the freshman year upon completion of the core foundation sequence.

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. B.A. students may pursue a graphic design focus or take a mix of art courses, that will lead to entry into a variety of other art and art related fields.

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 department encourages highly motivated students from graphic design 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 for review *after* acceptance to the University. 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, 3-5 of those should be drawings with at least two of the drawings from direct observation. There will be no in-person reviews. Portfolio review deadlines are October 1, November 1, January 1, and March 1, reviews will not take place at any other time..

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 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 advisers: 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.): 129 s.h.

Certification in Art Education

Core Studies: Students must complete the design-drawing foundation program (ART 142, 242, 133, 233), ART 312; plus three art history courses. Students must take the following required core courses (12 credits): Ceramics: Handbuilding or Wheel Throwing, Painting I, Survey Printmaking, and Fine Art Metals I or Sculpture I.

In addition, students must take an additional 15 credits of studio art, and complete the art education foundation program (ART 221, 322, and 325); 60 total credits must be completed from the art department.

The following courses are also required: EDFN 211, 241 and EDAR 461, 462, PSYC 100 and PSYC 227, two math classes, one ENGL literature, and 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 312 and any three 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 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, ART 142; select one beginning level course from the 2D or 3D studio areas; select one art history course; and select two additional art electives to complete the 18 s.h. program.**

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 adviser.

** 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 course designed for the non-art major which involves a general study of the role of historical and contemporary art in society. Discussions cover - What is art, why it is made, how it is made and the context in which it was created. Criticism and analysis are central to the course. Students will gain an understanding of the importance of art and the creative process in any culture and realize how it can enrich our human experience. Offered in fall, spring and periodically in the 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. A research project is required. Offered periodically.

ART 301: 3 s.h.**The Ancient World (G1)**

A survey of Western painting and sculpture from the Paleolithic through the Hellenistic periods. 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. Offered periodically.

ART 303: 3 s.h.**The 19th Century (G1)**

A survey of European art of the 19th century. Offered periodically.

ART 304: 3 s.h.**The 20th Century (G1, W)**

The varied schools and styles of painting and sculpture in the 20th century. Offered periodically. Prereq: ENGL 110.

ART 312: 3 s.h.**Survey of Art History (G1)**

A general survey of the art of the Western World with emphasis on the nature of style, medium, aesthetic changes and continuity. Criticism, analysis and evaluation of works of art related to their aesthetic worth and cultural significance are central to the course. Offered fall and spring.

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.

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.

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 periodically. Prereq: ENGL 110.

ART 588, 589: 3-6 s.h.**Topics in Art History**

Offered periodically.

*Art Education***ART 221: 3 s.h.****Introduction to Art Education**

The history of art education, current issues and theories, and practical problems involving visual resources in selected two and three dimensional art processes used in art education. Field experiences include observing art classrooms in county and city schools. For art education majors only. Offered in spring and fall.

ART 322: 3 s.h.**Child Development in the Visual Arts (W)**

Survey of the holistic development of children and adolescents; investigate theories of cognitive, social, physical, emotional and language development as it effects the artistic growth of the typical and atypical child. Influences of society, school culture, peers, economic status, race and gender. Analysis of artwork, media and material toward development of appropriate visual arts curricula. Field experience includes observing in city and county schools. Offered in fall and spring. Prereq: ART 221; EDFN 211, 241; ENGL 110; PSYC 227. Admission to APS (Advanced Professional Studies) or permission.

ART 325: 3 s.h.**Methodology and Pedagogy of Art (W)**

A survey of the pedagogy and methodology for students of all ages and developmental levels. Includes teaching and learning styles sensitive to the physiological, cognitive, emotional, social, perceptual and aesthetic make up of students. Introduction to art experiences relevant to students' needs, strategies for implementation and classroom management. Field experience in city and county schools. Offered in fall and spring. Prereq: ENGL 110, ART 322 or permission.

ART 327: 3 s.h.**Art for the Exceptional Child**

A survey of methods, materials and philosophy involved in teaching art to exceptional children. Open to all education majors. Offered periodically.

EDAR 461 and EDAR 462: 12 s.h.**Student Teaching and Seminar**

Student teachers in art education spend one-half semester in elementary schools and one-half semester in secondary. Seventh or eighth semester. (Eligibility requires students to have completed the art core program and 12 semester hours in art education. See catalog information regarding student teaching application and eligibility.) Offered in fall, spring.

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 524: 3 s.h.****Administration and Supervision of Art Programs****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 in 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 in fall, 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 periodically.

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 periodically.

ART 533, 534: 3-6 s.h.**Drawing**

Design

ART 141: 3 s.h.

Fundamentals of Studio Art (Non-Art Majors) (G1)

Introduces visual arts through studio experiences. Criticism, analysis and evaluation are central to the course as the student seeks creative, original solutions to artistic problems while working with various media and techniques. Emphasis on aesthetic expression and effective visual communication rather than on skills development. Offered in fall and spring, summer, and periodically in winter.

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 communications techniques. Artistic production, criticism, analysis and evaluation are central to this course. (For both non-art and art majors.) Offered in fall, spring.

ART 240: 3 s.h.

Typography I (G1)

History and development of communications systems especially as related to writing and the evolution of the Roman alphabet. Traces history of calligraphy and lettering in Western culture through study and studio practice. Includes creative design projects in layout and composition. Includes criticism, analysis and evaluation. (For both non-art and art majors.) Offered periodically.

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 in fall, spring. Prereq: ART 142.

ART 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 in fall and spring. Prereq: ART 133 and ART 142 (ART 240 is suggested, but not required).

ART 344: 3 s.h.

Visual Communications and Graphic Design I

Studio course explores typography and design processes in solving design and communication problems similar to those found in design studios and ad agencies. Offered in fall and/or spring. Prereq: ART 133, 142 or permission of instructor.

ART 345: 3 s.h.

Introduction to Computer Art

Explores and develops the capabilities for aesthetic expression native to computer-generated art forms. Includes system knowledge and preparation, artistic input, manipulation, display and output of chosen images in response to given assignments. Offered in fall and/or spring. Prereq: ART 133 and ART 142.

ART 346: 3 s.h.

Introduction to Computers in Design

Explores and develops capabilities for graphic expression through the use of computers in design. Various computer programs will be employed to developing formats, imagery and type applicable to graphic design problems. Includes system knowledge and preparation, artistic input, manipulation, display and output of designs. Offered in fall and/or spring. Prereq: ART 133 and ART 242.

ART 375: 3 s.h.

Illustration

Studio exploration of various illustration techniques and media appropriate for book, magazine and newspaper illustration. Offered periodically. Prereq: ART 133, 142 or permission of instructor.

ART 441: 3 s.h.

Advanced Design

Offered periodically.

ART 444: 3 s.h.

Visual Communications and Graphic Design II

Continued study in this area with an emphasis on concept development. Previous course work in typography suggested. Offered in fall and/or spring. Prereq: ART 344 or permission of instructor.

ART 445: 3 s.h.

Advanced Computer Art

Offered in fall and/or spring. Prereq: ART 345.

ART 446: 3 s.h.

Advanced Computers in Design

Offered in fall and/or spring. Prereq: ART 346

ART 447: 3 s.h.

Advanced Design II

Offered periodically.

Painting

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 in fall and spring. Prereq: ART 133, 142, or permission of instructor.

ART 354: 3 s.h.

Painting II

Continued development of painting skill with the emphasis on sustained individual development and technical expression. Offered in fall and 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 in fall and 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 in fall and 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. Prereq: ART 133 and ART 142.

ART 355: 3 s.h.

Watercolor II

Continued development of painting in watercolor with the emphasis on sustained individual development and technical expression. 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. 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. Prereq: ART 453 or permission of instructor.

ART 553, 555: 3-6 s.h.

Watercolor and Related Media

Graphics

ART 167: 3 s.h.

Nontraditional Photography

A studio course in alternative photographic processes for the artist, photographer and craftsperson. Camera not required. Offered periodically.

ART 306: 3 s.h.

Fine Art Photography I (G1)

An introduction to the value, function and perception of fine art photography through study and practice. Student work is analyzed, criticized and evaluated in terms of the photograph as fine art. (For both non-art and art majors.) Offered in fall, spring.

ART 366: 3 s.h.

Color Photography

Introduces basic techniques and materials of color photography with an emphasis on aesthetic approaches. The course includes a survey of color reversal films, color negative films and color print materials and techniques. Prereq: ART 306 or permission of instructor. Offered in spring.

ART 406: 3 s.h.

Fine Art Photography II

Photography as a working method for the creative photographer. Color techniques and various printing processes may be chosen to suit the individual photographer's objectives. Offered in fall and spring. Prereq: ART 306 or permission of instructor.

ART 409: 3 s.h.

Advanced Fine Art Photography

ART 567: 3 s.h.

Advanced Fine Art Photography II

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 in fall, spring. Prereq: ART 133 and 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 and 142.

ART 364: 3 s.h.

Relief Printmaking I

Explores multiple approaches to creating relief prints. Starts at an introductory level technically and builds with each new process 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 and 142.

ART 365: 3 s.h.

Intaglio Printmaking I

Explores multiple approaches to creating intaglio prints. Starts at an introductory level technically and builds with each new process 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 (ala poupee/monoprinting). Offered periodically. Prereq: ART 133 and 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 with each new process into an intermediate understanding and working knowledge of the process. Covers basic to intermediate stencil preparation including photographic processes. Offered periodically. Prereq: ART 133 and 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 periodically. Prereq: ART: 133 and 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 with each process 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 works 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 with each new process into an advanced understanding and working knowledge of the process. Covers sugar lift, white ground, toner transfers, spitbite, versacel, collograph solar plates, chine colle, ala poupee 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 with each new process 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 with each new process 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 periodically. 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 with each new process 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 periodically. Prereq: 300 level printmaking course.

ART 563, 564: 3-6 s.h.**Printmaking***3-Dimensional Studios***ART 282: 3 s.h.****Sculpture I (G1)**

An introduction to sculpture as a three-dimensional form of artistic expression with an emphasis on lost wax casting. The critical, the productive and the evaluative aspects of sculpture as art are central to the course. (For both non-art and art majors.) Offered in fall, spring.

ART 382: 3 s.h.**Sculpture II**

Continued development of individual artistic expression with emphasis on contemporary sculptural form. Offered in fall, spring. Prereq: ART 282.

ART 482: 3 s.h.**Sculpture III**

Further study in sculpture as the student works toward developing a personal idiom of expression. Offered in fall and spring. Prereq: ART 382.

ART 483: 3 s.h.**Sculpture IV**

Advanced study in sculpture in which the student continues to develop style and technique while discovering personal artistic direction. Offered in fall and spring. Prereq: ART 482.

ART 582, 583: 3-6 s.h.**Sculpture****ART 291: 3 s.h.****Fine Art Metals I (G1)**

Introduces jewelry and metals as a form of artistic expression. The student seeks creative solutions to visual problems while employing various metal working techniques and media. Critical analysis and evaluation of jewelry and metal art are central to the course. (For both art majors and non-art majors.) Offered in fall and spring.

ART 391: 3 s.h.**Fine Art Metals II**

Continued development of individual artistic expression in jewelry and metals with the emphasis on artistic inventiveness and personal style. Offered in fall and spring. Prereq: ART 291.

ART 491: 3 s.h.**Fine Art Metals III**

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. Offered in fall and spring. Prereq: ART 391.

ART 492: 3 s.h.**Fine Art Metals IV**

Advanced study in jewelry and metals in which the student continues to develop style and techniques while discovering personal artistic direction. Offered in fall and spring. Prereq: ART 491.

ART 591, 592: 3-6 s.h.**Fine Art Metals****ART 295: 3-6 s.h.****Ceramics I: Handbuilding (G1)**

Introduces clay and the ceramics process utilizing hand building methods. Emphasis on the productive, critical, cultural and historical aspects of ceramics as a form of artistic expression. Basic handbuilding and glazing techniques are employed as students seek creative solutions to visual problems (for both non-art and art majors). Offered in fall and spring.

ART 296: 3-6 s.h.**Ceramics I: Wheel Throwing (G1)**

Emphasis on the productive, critical, cultural and historical aspects of ceramics as a form of artistic expression. Basic wheel throwing and glazing techniques are employed as students seek original creative solutions to visual problems (for both non-art and art majors).

ART 297: 3 s.h.**Ceramics II**

Development of clay as a means for self expression. Introduces glaze preparation, experimentation and simplified glaze chemistry. Prereq: ART 295 or 296.

ART 396: 3 s.h.**Ceramics III**

Continued development of the student's own style and means of self expression. An in-depth study in one technical aspect related to the work being produced. Prereq: ART 297.

ART 497: 3 s.h.**Ceramics IV**

Advanced study in clay in which students continue to develop style and techniques as they pursue their own artistic direction. Prereq: ART 396.

ART 596, 597: 3-6 s.h.
Ceramics

Studio Topics

ART 686, 687: 3-6 s.h.
Topics in Art Studio

Independent Study

ART 498: 1-3 s.h.

Independent Study in Art

For further information on independent study, see the *Special Academic Opportunities* section.

ART 490: 3 s.h.

Professional Seminar and Exhibition

An independent problem culminating in the development of a portfolio and exhibition of the student's art work. The student is required to attend and participate in seminar activities for this course. Offered in spring. Prereq: Senior standing.

BIOCHEMISTRY

See Chemistry

BIOLOGY

School of Science and Mathematics

Professor Piperberg, chairperson

Associate Professor Ladd, allied health coordinator

Professors Ambler, Cosentino, Hepfer, Hoover, Reinking, Wallace, Whisenton-Davidson, Yocom, Zegers

Associate Professors Boal, DiBartolomeis, Moné

Assistant Professors Cebra-Thomas, Dagit, Hardy, Wagner, Zhong

Respiratory Therapy Clinical Faculty: Chrissos, Hughes, Rozans

Bachelor of Arts in Biology and Bachelor of Science in Biology

The Department of Biology offers three degrees and 10 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 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: botany, environmental biology, marine biology, molecular biology/biotechnology, respiratory therapy, medical technology, nuclear medicine technology, optometry, pre-athletic training and pre-podiatry.

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 "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 new 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 course work at West Chester. Upon completion, students will earn two bachelors' 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 and Sport Sciences* section of this catalog.

After completing three years of undergraduate study, students in the 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 is affiliated with two hospital-based medical technology 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 Lancaster General College of Nursing and Health Sciences School 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 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 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 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 adviser.

Retention-in-the-Major Policy

University requirements for retention must be met. In addition, all biology majors except those in allied health options (medical technology, nuclear medicine technology, optometry, pre-podiatry, and respiratory therapy) must earn grades of C (2.0) or better in BIOL 211, BIOL 221 and BIOL 263. Allied Health students must earn grades of C (2.0) or better in BIOL 211 and BIOL 263. These requirements must be satisfied before completion of 60 Millersville University credit hours. University students who change their major or their option within the biology major must satisfy the above requirements prior to completion of 30 additional credit hours. Transfer students with 60 credit hours or more must satisfy the requirements prior to completion of 30 Millersville University credit hours. Transfer students with fewer than 60 credits must follow the policy for all other majors. Any students failing to meet these requirements will be dropped from the biology major. Those who wish to re-enter the major must meet Admission-to-the-Major requirements.

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. 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.

Animal Behavior Option

BIOL 101, 211, 221, 343, 362, 364, 438, 485, 472. Electives to bring total biology credits to 46. 20 s.h. chemistry; 10 s.h. physics; 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, 242, 343, 362, 364, 375 and 448. 6 s.h. of directed electives from BIOL 345, 443 and 446. Electives to bring total biology credits to 49. 16 s.h. chemistry; 8 s.h. physics; 4 s.h. calculus (MATH 161); 4 s.h. Earth sciences (ESCI 221).

Biology Major (B.S.): 120 s.h.

Marine Biology Option

BIOL 101, 211, 221, 291 343, 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 science (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 31. 16 s.h. chemistry; 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.): 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. MU-WCU-athletic training credits earned via distance learning and one summer of mandatory course work 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 Pennsylvania College of Podiatric Medicine.

Biology Major (B.S.): 120 s.h.**Respiratory Therapy Option**

BIOL 101, 257, 356, 362, 364, 455 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 would be eligible to apply for graduation for 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 hours s. h. (Clinical II course work.) The respiratory therapy certificate is required for the student to qualify for certification examinations. Completion of the postbaccalaureate clinical program (Clinical II course work) also is necessary for employment as a respiratory therapist. See the ADA Policy section of the 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 course work at West Chester. Upon completion, students will earn two bachelors degrees from two universities in four years. For more information, please also refer to the Pre-Athletic Training Option description in the *Wellness and 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, MU is affiliated with two hospital-based medical technology 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 Lancaster General College of Nursing and Health Sciences School 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). 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 BSALHT and BS 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, 263, 352, 365, 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 course work 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, 263, 365, 454, 461. Directed electives to bring total biology credits to 30 to 32. MATH 130, 160. 16 s. h. chemistry, 4 s. h. physics, 27 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, 263, 365, 454, 461. Directed electives to bring total biology credits to 30 to 32. MATH 130, 160. 16 s. h. chemistry, 4 s. h. physics, 27 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, 455, 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.

Competency in Biology

Competency must be demonstrated before taking most 200-level courses. Competency may be demonstrated by: a) a course grade of "A" or "B" in AP Biology; b) a score of 3 or better in the national AP examination; c) a successful score on the CLEP examination; d) a successful score on a General Biology challenge or placement examination; e) a passing grade for General Biology (BIOL 100).

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 in fall, spring. Prereq: Biology major or biology minor or permission of instructor.

BIOL 103: 3 s.h.

The Science of Evolution (G2)

Evolutionary theory through an integrated perspective of both biology and geology. No credit for biology and earth science majors. Prereq: 15 credit hours recommended. Offered infrequently.

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 Biology 100. 1 hr. seminar. Offered in fall, spring. Prereq or coreq: BIOL 100.

BIOL 204: 3 s.h.

Human Biology (G2, W)

A non-laboratory 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 demonstrated competency, 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 demonstrated competency, 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 demonstrated competency, 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 demonstrated competency, 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 101 or BIOL 100 with a grade of C minus or higher; B minus 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, 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 101 or BIOL 100 with a grade of C minus or higher; B minus 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. 1hr. seminar. Offered periodically. Prereq: completion of BIOL 221 with a grade of B- or higher and 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 in fall, spring. Prereq: BIOL 100 or demonstrated competency, or BIOL 101 and MATH 235, 151, 160 or 161.

BIOL 242: 2 s.h.**Ecology Laboratory**

Introduction to techniques used in terrestrial and aquatic environments to gather ecological data, laboratory experiments, and quantitative data analysis using computers. 4 hrs. lab. Offered in fall, spring. Prereq or coreq: BIOL 241.

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 demonstrated competency, 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 in fall. Prereq: BIOL 100 or demonstrated competency, 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 in 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 in 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 in fall.

BIOL 263: 4 s.h.

Cell Biology (G2, L, W)

Cell structure and function including cellular ultrastructure, methods used in cell biology, cell motility, signal transduction, cell division, cellular macromolecules, organelles, metabolism, cell surface and the cytomembrane system. Laboratory includes isolation of cell components, enzyme kinetics, microscopy and other techniques used in the study of cell biology. 3 hrs. lec., 3 hrs. lab. Prereq: BIOL 100 or demonstrated competency, CHEM 112 and ENGL 110. Offered in fall, spring.

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 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 in fall or spring. Prereq: BIOL 100 or demonstrated competency, 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. 2 hrs. lec., 3 hrs. lab. Weekend field trips. Offered in fall. Prereq: BIOL 211.

BIOL 316: 3 s.h.

Invertebrate Zoology

Study of the morphology, physiology, behavior, adaptations, ecology, taxonomy, evolution and life history of members of the major invertebrate phyla. 2 hrs. lec., 3 hrs. lab. Offered infrequently. Prereq: 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 in spring, 2 of 3 years. Prereq: BIOL 211 and BIOL 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 in spring. Prereq: BIOL 221 and 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 in fall. Prereq: BIOL 221.

BIOL 326: 3 s.h.

Lower Plants

The structure, life histories and evolution of algae, bryophytes and the vascular cryptogams. Notes are made of their distribution, physiological peculiarities and pathogenicity or usefulness to people. 2 hrs. lec., 3 hrs. lab. Offered infrequently. Prereq: 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 in 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 in fall and spring. Prereq: COMM 100, ENGL 110, junior status and at least one science (G2 block) and one social science course (G3 block). May be used as biology elective if not applied to general education perspective requirement.

BIOL 343: 4 s.h.**Principles of Ecology and Evolution (W)**

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 in fall and spring. Prerequisites: BIOL 101 or 100 with a grade of C minus or higher; B minus or higher in BIOL 100 for biology majors; BIOL 211 and BIOL 221; MATH 160 or equivalent; ENGL 110.

BIOL 345: 3 s.h.**Applied Ecology (W)**

The application of ecological principles and methods to the solution of environmental problems in the fields of agriculture, forestry, fisheries and preservation of biological diversity are examined. Impacts of pollutants on ecosystems are discussed. A major focus is the use of biological processes to limit and/or reverse pollution and human-induced environmental degradation. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: BIOL 211, 221, 241 and 375 and ENGL 110.

BIOL 346: 3 s.h.**Ornithology**

Ecology, behavior, taxonomy and evolution of birds with emphasis on field studies. 2 hrs. lec., 3 hrs. lab. Weekend field trips. Offered in spring. Prereq: 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 in fall, spring. Prereq: 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 in fall. Prereq: BIOL 211.

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 in fall. Prereq: BIOL 211 and 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 in fall, spring. Prereq: BIOL 101 or 100 with a grade of C minus or higher; B minus or higher in BIOL 100 for biology majors; ENGL 110; CHEM 112 (or Co-Requisite).

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 in spring. Prereq: BIOL 263.

BIOL 364/564: 4 s.h.**Concepts 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 in fall, spring. Prereq: BIOL 101 or 100 with a grade of C minus or higher; B minus or higher in BIOL 100 for biology majors; CHEM 112.

BIOL 365: 3 s.h.**Genetics**

The gene is defined at biochemical, molecular, organismal and population levels. Lab investigations with *Drosophila*, microorganisms, cell culture, modern molecular genetic techniques. 2 hrs. lec., 3 hrs. lab. Offered in fall, spring. Prereq: BIOL 263; CHEM 231 or 235 recommended.

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 in fall, spring. Prereq: BIOL 100 or BIOL 101, and MATH 160.

BIOL 415: 3 s.h.**Mammalogy**

Phylogeny, taxonomy, adaptations, behavior and ecological relationships of mammals. Acquisition of laboratory and field techniques are stressed. 2 hrs. lec., 3 hrs. lab. Weekend field trips. Offered periodically in fall. Prereq: 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: 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: BIOL 211. 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: BIOL 221 and 263.

BIOL 427: 3 s.h.**Developmental Plant Anatomy**

Structure and function of cells, tissues and organs constituting the plant body. Developmental aspects such as cellular differentiation and organogenesis are used to enhance the understanding of plant structure and its variability. Investigations of plants in the laboratory and greenhouses including microtechniques, theory and application of light microscopy and basic photomicrography. 2 hrs. lec., 3 hrs. lab. Offered in fall. Prereq: 221. BIOL 263 recommended.

BIOL 428: 3 s.h.**Plant Morphogenesis**

Concepts of plant growth and development utilizing vascular and non-vascular plants. Includes developmental topics such as regeneration, cell production, polarity, correlative growth, developmental genetics, totipotency and integration. Laboratories stress experimental design and include microscopy, cell and tissue culture, cyto-histological techniques. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: BIOL 221, 263, 365 and CHEM 235 or 231.

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 in fall. Prereq: BIOL 211 and 263; CHEM 112 and 235 or 231.

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 in spring. Prereq: BIOL 221 and 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 process is stressed as well as the molecular mechanism of hormone action. 3 hrs. lec. Offered in fall. Prereq: 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 in spring. Prereq: 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: BIOL 211, 221, 241, 242 and 375.

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 in 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, her-

bivory and predation. Ecosystems viewed in a global perspective to understand global carbon and nutrient cycles. 3 hrs. lec./discussion. Offered in spring of even years. Prereq: BIOL 211, 221, 241, and 375 and ENGL 110. Prereq or coreq: BIOL 242.

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 Chesapeake Bay that cause eutrophication and population declines in fisheries. 2 hrs. lec., 4 hrs. lab/field. Offered in fall. Prereq: BIOL 241 and ENGL 110.

BIOL 448: 2 s.h.

Biological Problems of Environmental Management

Development of environmental management plans. Individual and/or group projects. Impact assessment and environmental planning will also be discussed. 2 hrs. lec. Offered annually. Prereq: senior standing in environmental biology (ecology) option (biology major).

BIOL 449: 4 s.h.

Plant Communities

Plant population ecology is integrated with plant population genetics in an endeavor to understand effective approaches in ecological restoration. An exercise in how to sample, assess, model and evaluate health of plant communities. 3 hr. lec., 3 hr. lab. Offered infrequently. Prereq: BIOL 242 and MATH 235 or BIOL 375 or equivalent; BIOL 325 and 365 recommended.

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 in spring. Prereq: BIOL 263.

BIOL 455: 3 s.h.

Cardiopulmonary Physiology

Cardiovascular and pulmonary functions are studied. Covers heart muscle, electro-mechanical properties of the heart, hemodynamics, mechanics of ventilation, gas transport and cardiovascular insufficiencies. Laboratory exercises include use of human subjects, animal experimentation and computer simulations. 2 hours lecture, 3 hours lab. Offered in spring. Prereq: BIOL 211, 263, 356 and CHEM 231 or 235 for the B.S. in Biology; CHEM 103 and CHEM 104 for the B.S. in Allied Health Technology.

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 in fall. Prereq: BIOL 263.

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 in fall. Prereq: BIOL 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 in fall. Prereq: 263; BIOL 365 recommended.

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 in spring. Prereq: BIOL 211, 221 and 263 or permission of instructor.

BIOL 466: 3 s.h.

Molecular and Cellular Techniques

Application and theory of techniques commonly used in biotechnology, 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 in 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 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 101 or BIOL 100. 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: Upper class 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. Co- 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**

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 hr. labs. Offered in spring. Prereq: BIOL 211.

BIOL 487: 3 s.h.**Evolution**

Broad survey of evolution, including development of evolution theory, history of life and mechanism of evolution. 3 hrs. lecture. Offered in fall, spring. Prereq: 12 s.h. biology including BIO 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 Marine Science Consortium. All courses 5 hrs. lec./lab.

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 297: 3 s.h.**Management of Wetland Wildlife**

The ecology and management of wetland wildlife, particularly of freshwater marshes and saltwater marshes. Special emphasis on ecosystem approach.

BIOL 391: 3 s.h.**Anatomy of Marine Chordates**

The speciation process in the marine environment to understand the structure of primitive chordates and to trace important trends in the evolution of various marine vertebrate lines.

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. For course descriptions, please refer to the *Graduate Catalog*.

BIOL 516: 4 s.h.**Aquatic Entomology****BIOL 588: 4 s.h.****Aquatic Plants****BIOL 589: 1-4 s.h.****Topics in Biology***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 hyperinflation 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 & 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 trouble-shooting, set-up, control function, alarm setting, and mode change. Prereq: RESP 421.

RESP 416: 2 s.h.**Current Perspectives in Cardiopulmonary Care**

Experts and guest lecturers present topics of current interest and/or controversy. A presentation on aspects of respiratory care services management includes financial management, quality improvement, documentation, risk management, continuing education and preparation for employment. The student completes an ACLS course and certification. Integrated lecture/lab. Prereq: RESP 414 or permission of program director.

RESP 417: 3 s.h.**Respiratory Care Techniques III**

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: 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, sub-acute 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 and 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 is presented. The student learns guidelines and calculations for correct ventilator set up. Prereq: RESP 420 and RESP 411.

RESP 422: 3 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 103 and 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 is stressed. Prereq: BIOL 461.

RESP 424: 2 s.h.**Non-Infectious 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 non-infectious 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 430: 2 s.h.**Clinical Practice I**

A skills-oriented laboratory course designed to prepare the respiratory therapy student to perform the following procedures in patient care areas: oxygen and aerosol therapy set ups, oxygen analysis, bedside mechanics measurements, chest physical therapy, pulse oximetry, pulmonary function screening, peak flow determinations, hyperinflation therapy, calibration of the blood gas analyzer, analysis of an arterial sample, radial artery puncture, brachial artery puncture, understand the principle of operation of blood gas electrodes, (pH, PCO₂, and PO₂), and the administration of pharmacologic aerosols. Prereq: RT Clinical students only.

RESP 431: 4 s.h.**Clinical Practice II**

A laboratory/patient care practice course including supervised clinical practice and mastery of skills learned in Clinical Practice I. The following new skills are mastered: endotracheal intubation, extubation and cuff management, tracheal aspiration, ventilator set up, ventilator check, ventilator circuit change, and complete pulmonary function testing. Prereq: RESP 413, 421, 430.

RESP 432: 13 s.h.**Clinical Practice III**

A 680-hour clinical practicum focusing on supervised advanced practice in a variety of regional medical centers. Prereq: RESP 431.

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 Americans with Disabilities Act

In keeping with its mission, goals, and in compliance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act, Millersville University and its consortium-affiliated hospital promote an environment of respect and support for persons with disabilities and will make reasonable accommodations. The definition of individuals with disabilities are 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 activity. 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 judgment 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, nonverbal communication with patients and their families, colleagues, health care providers, and the public.
- The ability to successfully complete all requirements needed to receive ACLS 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 the 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 (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

School of Humanities and Social Sciences

Professor Ellis, chairperson

Professors Frazer, Ghoreishi, Nakhai

Associate Professors Blazer, Galante, Guo, Leinberger, McCaskey

Assistant Professors Dillon, DiRusso, Kabongo.

The Department of Business Administration 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 Department of Business Administration 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 course work 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 department's 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 chairperson of business administration. 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 chairperson of business administration for an application.

The Department of Business Administration offers a Master of Business Administration. All undergraduate business majors could complete the MBA degree in one year. Business minors would meet most, if not all, undergraduate prerequisites to complete the MBA degree in one year. Please refer to the Millersville University *Graduate Catalog* for more information on the program.

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 non-business 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 Department of Business Administration: ECON 101, ECON 102, BUAD 161, BUAD 162 and BUAD 202.

Business Core

General Business: BUAD 202, 207, 306, 308

Accounting: BUAD 161, 162

Finance: BUAD 341

Management: BUAD 251, 352, 455

Marketing: BUAD 231

Required Related Non-business 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 201; 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, 366, 364.

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.

BUAD 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 in fall, spring. Prereq: ECON 101, 102.

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 in fall, spring.

BUAD 207: 3 s.h.**Introduction to Information Science**

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 in fall, spring. Prereq: BUAD 162.

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 306: 3 s.h.

Research Methods in Business

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 in fall, spring. Prereq: MATH 235.

BUAD 308: 3 s.h.

Quantitative Methods For Business

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 in fall, spring. Prereq: MATH 235.

BUAD 310: 3 s.h.

The Economics of Justice (P)

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 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 in 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 in fall, spring. Prereq: MATH 101 or MATH placement beyond MATH 101 (MATH 160, 161, 151, 163H, 155H).

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 in fall, spring. Prereq: C- or higher in BUAD 161 for BUAD majors/minors.

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 in fall, spring. Prereq: C- or higher in BUAD 162 for BUAD majors/minors.

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 in fall, spring. Prereq: C- or higher in BUAD 361 for BUAD majors/minors.

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 for BUAD majors/minors.

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 in fall, spring. Prereq: C- or higher in BUAD 162, for BUAD majors/minors.

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 health care 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 annually. Prereq: C- or higher in BUAD 162 for BUAD majors/minors.

BUAD 367: 3 s.h.**Federal Income Tax II**

Study of corporate, S Corporations 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. 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 annually. Prereq: C- or higher in BUAD 361 for BUAD majors/minors.

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 annually. 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 in fall, spring. Prereq: ECON 102, C- or higher in BUAD 162 for BUAD majors/minors 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, spring. Prereq: C- or higher in BUAD 341 for BUAD majors/minors, MATH 235, and BUAD 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 periodically. Prereq: C- or higher in BUAD 341 for BUAD majors/minors.

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 for BUAD majors/minors.

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 annually. Prereq: C- or higher in BUAD 341 for BUAD majors/minors.

BUAD 346: 3 s.h.**Principles of Bank Administration**

Bank investment practices, liquidity management, deposits acquisition and administration, branch location decisions, optimal bank capital, math-

ematical model in banking, management science in banking, computers and checkless banking. Offered periodically. Prereq: C- or higher in BUAD 341 for BUAD majors/minors.

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 periodically. Prereq: C- or higher in BUAD 341 for BUAD majors/minors.

BUAD 445: 3 s.h.

Financial Markets (W)

Classical and modern thought on markets. Numerous modern markets are investigated in terms of functionality, strategy and development. Offered annually. Prereq: ECON 101, BUAD 342 and ENGL 110.

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 annually. Prereq: BUAD 342 and ENGL 110.

Management

BUAD 251: 3 s.h.

Organization and Management (G3, W)

Examines elements of the management process: planning, organizing, leading and controlling. Introduces principles and concepts of management applicable to a wide variety of profit and nonprofit organizations. Includes management as a discipline, evolution of management theory, organizational environment, social responsibility and ethics, elements of management process, alternative organizational models, effective decision making and emphasis on emerging quality and international issues. Offered in fall, spring. Prereq: ECON 101, 102 and ENGL 110.

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 annually. Prereq: C- or higher in BUAD 251 for BUAD majors/minors.

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 in fall, spring. Prereq: C- higher in BUAD 251 for BUAD majors/minors.

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 for BUAD majors/minors.

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 annually.

BUAD 356: 3 s.h.

Small Business Management

The small business environment with emphasis on entrepreneurship. Students learn how to start and manage a small business. Solving problems in small firms through adequate planning, implementing, and controlling strategies in accounting, finance, management and marketing. Offered in fall, spring. Prereq: ECON 102, BUAD 308, C- or higher in BUAD 251 for BUAD majors/minors.

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 annually. Prereq: C- or higher in BUAD 251 for BUAD majors/minors.

BUAD 452: 3 s.h.**Production and Operations 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 in fall, spring. Prereq: MATH 130 or 235, C- or higher in BUAD 251 for BUAD majors/minors.

BUAD 455: 3 s.h. (W)**Strategic Management**

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 in fall, spring. Prereq: BUAD 202, 207, 231, 306, 308, 341, 352 and ENGL 110.

BUAD 457: 3 s.h.**Japanese Management**

Japanese organizational climate, the styles of management, theories and principles of management; contrasts and similarities of theories and principles used in Japan and the United States. Includes management, systems, culture, and environment. Offered periodically. Prereq: C- or higher in BUAD 251 for BUAD majors/minors.

*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 in 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 annually. Prereq: C- or better in BUAD 231 for BUAD majors/minors.

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 annually. Prereq: C- or better in BUAD 231 for BUAD majors/minors and 60 credits.

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 annually. Prereq: C- or better in BUAD 231 for BUAD majors/minors.

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 infrequently. Prereq: C- or better in BUAD 231 for BUAD majors/minors.

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 annually. Prereq: C- or better in BUAD 231 for BUAD majors/minors.

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 for BUAD majors/minors.

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 for BUAD majors/minors.

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

School of Science and Mathematics

Professor Turchi, chairperson
 Professors Hill, Iannone, Rajaseelan, Rickard, Wismer
 Associate Professors Anna, Mbindyo
 Assistant Professors Bonser, Miller, Schiza
 Instructor C. Greco

The Department of Chemistry, accredited by the American Chemical Society, 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 three 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 either of these degree programs leads to certification of the graduate by the department to the American Chemical Society, which offers immediate membership eligibility in 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 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 cooperative education. Applicable to any of the above degree options, cooperative education offers 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 co-op 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-3/2 cooperative engineering option within the B.A. program requires three years of study as a chemistry major in the Millersville University liberal arts curriculum with two years of residence in the chemical engineering program at Pennsylvania State University. At the end of five years, the student receives two baccalaureate degrees: a B.A. in chemistry from Millersville and a B.S. in chemical engineering from the cooperating engineering school.

The associate of science degree (A.S.) offers two programs of study. The associate of science in chemistry is a two-year program designed to train students for technical positions in the chemical industry. The associate of science pre-pharmacy option is also a two-year program designed for those students who are interested in a career in pharmacy. These students graduate with a two-year degree from Millersville and then continue on with their studies in pharmacy school.

In an effort to ensure that each student is properly placed, the department administers chemistry placement tests to all new students during their respective orientation programs.

COURSE REQUIREMENTS

Chemistry Majors (B.S.): 120 s.h.

55 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 s.h. minimum from CHEM 324, 327, 328, 375, 381, 435, 476, 482, 486, 498, 499, COOP 300, 400. Required related courses: MATH 161, 211, 311 and PHYS 231, 232 plus 4 credits in computer science, mathematics and/or physics.

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 2 s.h. minimum selected from CHEM 324, 381, 375, 391, 392*, 435, 452, 476, 482, 486, 498, 499, COOP 300, 400. Required related courses: competency equivalent to BIOL 100, plus BIOL 263 and two of BIOL 365, 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, 375, 341, 342, 465, 476, 487, 488, 498 (1) plus 4 s.h. minimum selected from CHEM

324, 326, 327, 328, 381, 391, 392, 435, 452, 486, 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 s.h.) selected from BIOL 241, ESCI 245, 349, 426, GEOG 202, OSEH 321.

Chemistry Major (B.S.): 120 s.h.

Nanotechnology Option

37 credits in chemistry, CHEM 111, 112, 188, 231, 232, 251, 265, 302, 341, 342, 498, plus 4 s.h. selected from CHEM 326, 375 or 381. Required related courses: 12 credits MATH 161, 211, 311; Physics, 10 credits 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, 487, 482, 487, 488, 498 (1) plus 11 s.h. minimum selected from CHEM 324, 326, 327, 328, 375, 391, 392, 435, 476, 486, 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, 498, 499; COOP 300, 400. Required related courses: PHYS 231, 232; MATH 161, 211, 311; competency equivalent to the first two courses in a foreign language.

Chemistry Major (B.A.): 120 s.h.

3/2 Cooperative Engineering Option

21 s.h. in chemistry: CHEM 111, 112, 188, 231, 232, 265. Required related courses: PHYS 231, 232, 233, 311; MATH 161, 211, 311, 365; ITEC 241; ECON 100, 101, or 102; CSCI 161. Specific engineering curricula have additional requirements; students should consult adviser or chemistry department chairperson.

Chemistry Major (B.S.Ed.): 128 s.h.

Certification in Secondary Education

40 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.

Chemistry Major (A.S.): 60 s.h.

23-24 s.h. in chemistry: CHEM 111, 112, 231, 232, 265 plus one elective. Required related courses: PHYS 131 (or 231), 132 (or 232); MATH 161 (or 160).

Chemistry Major (A.S.) 60 s.h.

Pre-Pharmacy Option

20 s.h. in chemistry: CHEM 111, 112, 231, 232, 265. 19 s.h. of required related courses in mathematics, physics and biology; and 21 s.h. of General Education courses. Chemistry students aspiring to attend a pharmacy program would be advised to take an economics course and either a psychology or sociology course as G3 electives. These courses are highly recommended to satisfy pre-requisite admission requirements at many pharmacy programs.

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 in fall.

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 in spring.

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 in 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. Placement in CHEM 110 on the basis of placement examination before registration. 3 hrs. lec./problem solving. Offered fall, spring and online in summer.

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: C- grade or higher in CHEM 110, or satisfactory score on the Chemistry Placement Test (CPT) before registration, or permission of chair.

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 better 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. Corequisite: concurrent registration in CHEM 112 is required. Prereq: CHEM 111 grade B- or better and consent of Honors College Committee.

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 in 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 in spring.

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, 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, spring. 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 in 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 in spring. Prereq: CHEM 112 with a grade of C- or higher; C for chemistry majors.

CHEM 302: 3 s.h.

Chemistry in Nanotechnology

A study of principles, methods and applications of chemistry in nanotechnology. Nanoscale processes, materials and surfaces will be studied from a chemistry perspective. Topics include chemistry of surfaces, synthesis of nanometer scale materials, surface functionalization, sensors, colloids and nanofabrication. A study of techniques used to characterize nanoscale materials including scanning, transmission and atomic force microscopy. 2 hrs. lec., 3 hrs. lab. Offered in spring. Prereq: CHEM 104 or CHEM 111 and NMT 313 or CHEM 112 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 in 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. Offered fall, spring. Prereq: CHEM 232 or 235.

CHEM 327: 4 s.h.

Biochemistry II

Dynamic aspects of biochemistry; enzyme reactions including energetics, kinetics and mechanisms. Major emphasis on intermediary metabolism of fats, carbohydrates, lipids, proteins, nucleic acids and other macromolecules. Photosynthesis, electron transport phosphorylation and replication mechanisms also presented in detail. 3 hrs. lec., 3 hrs. lab. Offered in spring. Prereq: CHEM 232 and 326.

CHEM 328: 1 s.h.

Analytical Biochemistry Laboratory

Introduction to biochemistry literature research, methodology of enzyme assays and peptide synthesis, and techniques used for separation, analysis and characterization of all major classes of biologically important compounds. 3 hrs. lab. Offered in spring. Prereq or Coreq: CHEM 327.

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 electro-chemistry. 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 in fall. Prereq: CHEM 265, PHYS 232, MATH 311 and ENGL 110.

CHEM 342: 4 s.h.

Physical Chemistry II (W)

Chemical kinetics, statistical mechanics, 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 in spring. Prereq: CHEM 341, and ENGL 110.

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 twentieth century. The relationships between chemical developments and society are explored, as well as the influences of chemistry on Western thought. 3 hrs. discussion. Offered in spring. Prereq: COMM 100, ENGL 110; junior status; CHEM 102, 104, or 111; 2 social science courses, including one history course: HIST 101, 102, or 410 preferred.

CHEM 375: 4 s.h.

Environmental Chemistry (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 fall semesters. Prereq: 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 in fall. Prereq: 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 in spring. Prereq or Coreq: CHEM 251.

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 spring. Prereq: 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, bioinorganic chemistry. 3 hrs. lec. Offered in fall. Prereq: CHEM 251 and 342 or permission of instructor.

CHEM 465: 4 s.h.**Analytical Chemistry**

Theory and practice of modern analytical techniques in chemical separations and instrumental analysis. 3 hrs. lec., 3 hrs. lab. Offered in spring. 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 spring 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 in 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 in spring. Prereq: CHEM 487 and co-req: 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. Prereq: permission of instructor. For further information on independent study, see the *Special Academic Opportunities* section.

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

School of Humanities and Social Sciences

Associate Professor Boyle, chairperson
 Professors Dorman, Seigworth, Umble
 Associate Professors Chang, Elliott, Russell-Loretz, Wood
 Assistant Professors Capece, Igyor, Irwin, Sreiber
 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 adviser.

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 are available from the departmental office. Options or minor programs of study must be chosen by students with their adviser'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; students' 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 adviser.

Speech Communication Major (B.S.)

Communication Studies Option

Required courses: Core courses above plus the following: COMM 217, 224, 311, 305, 324, 342 or 403, 429 or 441. Additional Requirements: Students in the communication studies option must complete a University-approved minor outside the department.

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, 451, 452. Additional Requirements: BUAD 101, ENGL 313, 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 adviser.

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 or 6 s.h.

Coop/Internship in Communication

COMM 400: 3 or 6 s.h.

Coop/Internship in Communication

COMM 500: 3 or 6 s.h.

Coop/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 upon the selection and organization of information for persuasive purposes. Satisfies competency requirement.

COMM 101: 3 s.h.

Introduction to Communicology (G1)

Introduction to the study of human communication, discourse study and the means by which theatre and communication act as mutual influences on one another. Offered in fall, spring. Prereq: COMM 100.

COMM 201: 3 s.h.

Theories of Communication (G1)

Introduction to the study of human efforts to exchange meanings. Offered fall, spring. Prereq: COMM 100 and for communication majors, COMM 101.

COMM 217: 3 s.h.

Interpersonal Communication (G1)

Students study the nature of human interpersonal relationships from a communicologist's standpoint. Combines both theory and experiential application to afford students a means to analyze relationships and to integrate more effective communication strategies in their lives. Offered in fall, spring.

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 in fall. Prereq: COMM 201.

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: COMM 201, ENGL 110.

COMM 303: 3 s.h.**Principles and Practices of Small Group Communication**

Study and application of small group communication processes. Offered fall or spring. Prereq: COMM 201, 224.

COMM 305: 3 s.h.**Business and Professional Communication**

Principles of public speaking, organization and adaptation of speech materials, effective presentation styles, forms of proof. Offered periodically. Prereq: COMM 100, ENGL 110 and junior status.

COMM 311: 3 s.h.**Environmental Advocacy (G1)**

Environmental advocacy explores the persuasive nature of the means by which ordinary citizens, environmental groups, corporations and anti-environmental opponents seek to influence the policies and practices affecting our natural and human environments. The course will focus on current and historical controversies and campaigns to protect or oppose environmental values ranging from such diverse groups as environmental movements, Native American concerns, community concerns, corporate concerns and governmental policies. Offered in fall. Prereq: COMM 100 and ENGL 110.

COMM 317: 3 s.h.**Intercultural Communicology (D, G1,W)**

Explores the possibilities of communication between and among diverse cultures. Prepares students for participation in the global community through close study of cultural codes, symbolic interaction, nonverbal behavior, and contexts of intercultural contact at multiple levels (intrapersonal, interpersonal, group organizational and societal-cultural). Students develop understanding and appreciation of human diversity and competence in intercultural communication practices. Prereq: English 110 and junior class standing.

COMM 324: 3 s.h.**Advanced Topics in Organizational Communication**

Content varies. Selected theoretical perspectives and topics in depth. Potential topics include: organizational cultural and critical studies; organizational conflict and conflict resolution processes; organizational semiotics; organizational group issues; decision making and leadership. Offered in spring. Prereq: COMM 100, 101, 201, 224; Junior status or permission of instructor.

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 infrequently. Prereq: COMM 100.

COMM 380: 3 s.h. (W)**Digital Media Writing**

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; web site writing and layout. Offered fall, spring. Prereq: ENGL 110, COMM 351 or COMM 326 and 60 semester hrs.

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: COMM 301.

COMM 403: 3 s.h.**Persuasion**

Persuasive speaking from both the modern and classical points of view. Offered in 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: COMM 301.

COMM 430: 3 s.h.**Culture and the Semiotics of Communication**

Verbal and nonverbal signs and the realities they seem to represent. Various cultures reproduced as systems of signs and how these are coded as ideologies and myths. Taken-for-granted experiences of language and discourse are decoded through the experiential encounter of signs from other cultures. Offered periodically.

COMM 441: 3 s.h. (G1, W)**Political Communication**

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 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 in fall or spring.

COMM 251: 3 s.h.**Public Relations I: Introduction to Principles and Theory (G1)**

The first of a 4-course sequence covers the history, principles and current practices of public relations. Series must be taken sequentially. Offered in fall, spring.

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 in fall, spring. Prereq: COMM 251, ENGL 110.

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 in fall, spring. Prereq: 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 in 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 in fall, winter, 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 in 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 in 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 in 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 (W)**

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 in fall. Prereq: ENGL 110, COMM 121 and basic typing skills.

COMM 326: 3 s.h.**Broadcast Workshop I (W)**

Basic news writing and reporting, stressing electronic media. Offered in fall. Prereq: ENGL 110 or permission of instructor.

COMM 330: 3 s.h.**Media and Women's Culture (P)**

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 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 in spring. Prereq: COMM 321.

COMM 422: 3 s.h.**Advanced Audio Production**

Intensive analysis of field and studio techniques with emphasis on multi-track 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 in spring. Prereq: COMM 320, 326, ENGL 110.

*Theatre***THEA 120: 3 s.h.****Stagecraft**

Construction and handling of stage scenery; training in technical theatre. Offered annually.

THEA 130: 3 s.h.**Acting I (G1, W)**

Training in the art and craft of acting. Emphasis on developing basic skills and exploring the creative process. Elementary scene and monologue work. Offered in fall. Prereq: ENGL 110.

THEA 217: 3 s.h.**Theatre Appreciation (G1)**

Historical and analytical approaches to the theatrical experience. Emphasis on the combination of communicative media involved in the experience. Offered annually.

THEA 220: 3 s.h.**Lighting and Sound**

An advanced study of the equipment and techniques involved in theatrical lighting and sound. Offered infrequently.

THEA 230: 3 s.h.**Acting II (G1)**

Purpose of acting and underlying principles, as well as training voice and body to project characterization. Offered bi-annually 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 infrequently.

THEA 312: 3 s.h. (G1)**History and Principles of Stage Design**

The history of scene, lighting and costume design for the stage, and the study of common aesthetic principles shared by all areas of stage design. 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 bi-annually in spring. Prereq: THEA 130 or permission of instructor.

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 1700. 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 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, 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 the area of theatre production. May be taken more than one semester for credit as topic varies. Topics include design, production, direction, performance and criticism. Offered annually. Prereq: permission of instructor.

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 AND DESIGN TECHNOLOGY

See Industry & Technology

COMPUTER SCIENCE

See Computer Science and Physics

COMPUTER SCIENCE

School of Science and Mathematics

Associate Professor Hutchens, chairperson

Professors Liffick, Webster

Associate Professors Chaudhary, Elzer, Zoppetti

Assistant Professor Mollah-Hardy

The Department of Computer Science offers a baccalaureate degree and an associate degree in computer science. It also offers a minor in computer science.

The bachelor of science degree program in computer science is accredited by the national Accreditation Board for Engineering and Technology (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. Millersville University is one of the few universities in Pennsylvania that is 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 to allow students to study advanced topics such as programming languages, compiler design, software engineering, artificial intelligence, robotics and computer vision, human computer interaction, algorithms, networking, computer graphics, virtual reality, internet programming, parallel programming and database management. 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 MU for evaluation. University credit for freshman level computer science major course(s) 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 - E, below.

A. Required CSCI Courses: 36 s.h.

CSCI 140, 161, 162, 330, 340, 362, 370, 380, 420.

B. Required CSCI electives: 12 s.h.

Three of the following: CSCI 300, 375, 395, 406 (4 cr.), 412, 415, 425, 426, 435, 450, 456, 466, 467, 475, 476, 498.

C. Required Related MATH Courses: 14-15 s.h.

MATH 161, 211, 235 and (PHIL 312, or MATH 236 or above but not 301, 304, 405).

D. Required Related Natural/Physical Sciences: 12 s.h.

At least 12 s.h. of natural/physical science courses: biology, chemistry, Earth sciences and/or physics that are intended for science majors. These courses must include a two semester laboratory sequence. BIOL 100, general biology, and one of the following biology courses: BIOL 211, 221, 263, or CHEM 111, 112, or PHYS 231, 232, or ESCI 221, 222, or ESCI 241, 261, or ESCI 241, 245.

E. 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 Major (A.S.): 60 s.h.**A. Required Courses: 11-14 s.h.**

CSCI 161, 162; one MATH or PHYS course.

B. CSCI Electives: 16-19 s.h.

CSCI electives will be selected based upon the student's background and objectives.

C. Technical Writing Requirement: 3 s.h.

ENGL 312.

Computer Science Minor: 20 s.h.**A. Required CSCI Courses: 16 s.h.**

One of the following: CSCI 101, 111, 121 and all of the following: CSCI 161, 162, 362.

B. CSCI Electives: 4 s.h.

Choose any 300 or 400 level computer science major course not in required CSCI courses 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, 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, keyboard and mouse handling, document object model and graphical interface control objects. Some coverage of VBScript and conversion from Microsoft Office® applications to Web pages. 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 in 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 in 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/CSCI 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 in fall, spring. Prereq: C- or higher in CSCI 140 and CSCI 162.

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 in 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 3-D objects. Graphical programming assignments use current hardware, software and graphic standards. Topics include graphics pipeline, vertex processing, 3-D 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 in 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: eCommerce: Concepts and Programming: 4 s.h.

This course will provide students with the skills necessary to design and develop e-Commerce Web sites. The course will cover the topics from disciplines of e-commerce, e-business and computer science. The topics include business models, marketing on the Web, business-to-business strategies, online-auctions, legal and ethical issues, and creation of secure and effective e-Commerce Web sites using currently available platforms and technologies. Offered periodically. Prereq: C- or higher in CSCI 362

CSCI 415: Computer and Network Security: 4 s.h.

This course is designed to introduce student 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 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 applying techniques. Offered periodically. 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 LISP or Prolog. Offered periodically. Prereq: C- or higher in CSCI 340, 362; ENGL 110.

CSCI 456: 4 s.h.

Robotics and Computer Vision

Intelligent robotic systems that deal with 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 infrequently. C- or higher in CSCI 362.

CSCI 466: 4 s.h.

Database Management Systems

Introduction to software design using a 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 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

Provide 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; behavior-based animation and control; facial animation; smart characters and intelligent agents. 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, 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 significant study or project in some area of computer science. A written report is required. Prereq: departmental permission.

CONSTRUCTION TECHNOLOGY

See Industry and 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

EARTH SCIENCES

School of Science and Mathematics

Professor Clark, chairperson

Professor Yalda

Associate Professors DeCaria, Marquez, Price, Sikora,

Assistant Professors Kumar, Vaillancourt

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 but who do not intend to continue their studies in a particular academic area. 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 or to prepare for employment in an earth science field.

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 of 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 Consortium. In particular, one course required in the oceanography major (Field Methods in Oceanography) must be taken through the Consortium at Wallops Island, Virginia. For more information see *Marine Science Consortium in the Special Academic Opportunities* section.

The Department of Earth Sciences is an Academic Affiliate of the University Corporation for Atmospheric Research and is an institutional member of the American Meteorological Society. For more information, see www.millersville.edu/esci.

COURSE REQUIREMENTS

Earth Sciences Major (B.A.): 120 s.h.

ESCI 110, 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 adviser. Required related courses: CHEM 111, 112; PHYS 131, 132; MATH 161, 235.

Earth Sciences Major (B.A.): 120 s.h.

Environmental Geology Option

ESCI 110, 221, 222, 227, 261, 385 plus 15-16 s.h. of Earth science electives. Required related courses: CHEM 111, 112; PHYS 131, 132; BIOL 211, 221, 241; MATH 161, 235.

Geology Major (B.S.): 120 s.h.

ESCI 110, 221, 222, 227, 321, 326, 328, 423, 425. Choose 6 s.h. from: ESCI 225, ESCI 281 or GEOG 295, 320, 322, 323, 329, 422, 424, 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 110, 241, 282, 340, 341, 342, 343, 386, 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 110, 241, 261, 267*, 362, 363, 364, 366, 380, 465*, 466*, 467* (*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 science, biology, chemistry, mathematics or physics that apply towards a major in that department.

Ocean Science and Coastal Studies Major (B.S.): 120 s.h.**Physical Oceanography Option**

ESCI 110, 221, 241, 261, 267, 282, 362, 363, 364, 365, 380, 485. ESCI 423, 466 and MATH 467 are highly recommended. Required related courses: CHEM 111, 112; MATH 161, 211, 311, 365; PHYS 231, 232, 311, 312, 334.

Earth Sciences (Education) Major (B.S. Ed.): 126 s.h.**Certification in Secondary Education**

ESCI 110, 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

ESCI 221, 222, plus 12 s.h. of geology course work at the 200, 300 and/or 400-level. 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, 364, 465; two from ESCI 267, 282, 380, 386, 466; one from ESCI 365, 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). Total 21 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 fall, spring and periodically in summer.

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 in fall, spring and periodically in summer.

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 science majors. Prereq: 15 credit hours recommended.

ESCI 104: 3 s.h.**The World Ocean (G2)**

A broad overview of the biological, chemical, geological and physical characteristics of the ocean, the importance of the oceans to mankind and the environment. Does not count toward any ESCI major. 3 hrs. lec. Offered in fall, spring and periodically in summer.

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 in 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 in 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 in fall, spring and online in summer and winter.

ESCI 110: 2 s.h.**Introduction to Earth Sciences Programs**

General introduction to each of the earth sciences disciplines and to college life. 2 hrs. lec. Offered in fall. Restricted to earth sciences majors with less than 30 credits.

ESCI 202/202H: 4 s.h.**The Earth in Space (G2, L)**

A quantitative 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 calculus, supported by observation, experiment and theory. 3 hrs. lec., 2 hrs. lab. Offered periodically in spring. Prereq: MATH 161 or MATH 163 or MATH 155. Restricted to students in the University Honors College, B.S. Ed. in earth sciences, or who have at least a 3.35 GPA.

*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 in fall, spring and periodically in summer.

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 in spring. Prereq: 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 in fall of odd years. Prereq: 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 in fall of odd years. Prereq: ESCI 221, Prereq or Coreq: CHEM 112.

ESCI 320: 3 s.h.**Roads West: Geology, Technology, Society and the American Experience (P)**

The development of geological science in Europe and its maturation in North America; the historical origins of geological ideas in the context of the American experience, especially westward expansion. Basic knowledge of world and U.S. history is assumed. 3 hrs. lec. Field trips required. Offered infrequently. Prereq: ESCI 101 or ESCI 102 or ESCI 221; COMM 100; ENGL 110; junior status.

ESCI 321: 3 s.h.**Structural Geology (W)**

Principles and processes of rock deformation; architecture of the Earth's crust and distribution of major structural elements. 2 hrs. lec., 3 hrs. lab, field trips required. Offered in fall of even years. Prereq: ESCI 221; ENGL 110.

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 in fall of even years. Prereq: C- grade or higher in ESCI 221, ESCI 241 or GEOG 230 and 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 in spring of odd years. Prereq: 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 in spring of even years. Prereq: 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 spring of odd years. Prereq: ESCI 221, CHEM 112; ENGL 110.

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: ESCI 321.

ESCI 423: 3 s.h.**Engineering Geophysics**

Geophysical methods applied to civil engineering and environmental sciences; seismic refraction and reflection, electrical resistivity and conductivity, gravity and geomagnetism. 2 hrs. lec., 2 hrs. lab. Offered in fall of even years. Prereq: ESCI 221 and PHYS 232.

ESCI 425: 3 s.h.**Geodynamics**

Composition and state of the Earth's interior; recent contributions from geophysics and geochemistry; plate tectonics in relation to internal physical processes; evolution of the Earth before and during the Phanerozoic. 3 hrs. lec. Offered in spring. Prereq: ESCI 321 and 328, PHYS 231.

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 in spring of odd years. Prereq: ESCI 221, MATH 161.

ESCI 427: 3 s.h.**Engineering Properties of Earth Materials**

Soil and rock as materials of construction; sampling and testing; problems encountered in unstable ground; prediction of performance and corrective measures. 3 hrs. lec./lab. Offered infrequently. Prereq: ESCI 321.

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 in fall. 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 in spring of even years. Prereq: C- grade 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 in fall and as needed in spring. Coreq or Prereq: MATH 161 or 163, and PHYS 131 or PHYS 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 in spring and online in summer. Prereq: 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 in spring. Prereq: 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 in fall. Prereq: 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 in fall. Prereq: 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 in spring. Prereq: 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 in fall of odd years. Prereq: ESCI 341, 342.

ESCI 347: 3 s.h. (G2)**Satellite Meteorology**

Theory of weather satellites including orbital characteristics and signal receipt, synoptic weather interpretation, mesoscale features, precipitation signatures, fog, wind shear, tropical weather systems. 3 hrs. lec. Offered in 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 in spring. Prereq: 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 in spring of odd 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)**

Overall intellectual and institutional development of meteorology from Aristotle to present with emphasis on the 20th century. Historical overviews of dynamic meteorology and numerical weather prediction, observational tools (history of radar and satellites) and computational devices, cloud microphysics and dynamics, hurricanes, convective storms and climatology. Spotlight key scientists and their role in the advancement of atmospheric sciences. 3 hrs. lec. Prereq: ESCI 107, 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 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 in spring of even years. Co-req: MATH 365; Prereq: ESCI 342, and either ESCI 340 or PHYS 233; or permission of the instructor.

ESCI 441: 3 s.h.**Synoptic Meteorology Lecture-Laboratory I**

Dynamics and physics of the atmosphere as revealed by observational data and numerical output; subjective and objective analysis of meteorological data; use of standard meteorological graphics software; current weather discussions. 2 hrs. lec., 4 hrs. lab. Offered in fall. Prereq: ESCI 342.

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 in spring. Prereq: ESCI 441 and one semester of Campus Weather Service or by permission of the instructor. Coreq: ESCI 444.

ESCI 443: 3 s.h. (W)**Climate Dynamics**

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 in spring. Prereq: ESCI 343 or ESCI 364.

ESCI 444: 4 s.h.**Meso- and Storm-Scale Meteorology**

Study of high-impact events that threaten life and property. Microphysical and dynamic aspects of severe convective systems, mesoscale convective complexes, squall lines, jet streaks, gravity waves, strong turbulence, damaging winds, hailstorms, tornadoes and flash flooding. 4 hrs. integrated lec./lab. Offered in 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 in spring of odd-numbered years. Prereq: ESCI 282 or CSCI 161. Coreq or Prereq: ESCI 343 or ESCI 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 in fall. Prereq: MATH 235, MATH 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 in 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 to 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 in spring of even years. Prereq: 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 in spring of even years. Prereq: 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 in fall, spring. Prereq: MATH 155H, MATH 160, MATH 161 or MATH 163.

ESCI 267 or MAR. SCI. 221: 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 Marine Science Consortium field station. Prereq: ESCI 261.

ESCI 362 or MAR. SCI. 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 in spring of odd years. Prereq: ESCI 261 or 221.

ESCI 363 or MAR. SCI. 331: 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 in fall of odd years. Prereq: ESCI 261 and CHEM 112.

ESCI 364 or MAR. SCI. 364: 3 s.h.

Descriptive Physical Oceanography

Physical properties of seawater; mass and energy budgets of the ocean; typical distribution of water characteristics; dynamic computation of current; circulation and water masses of the ocean; nature of waves and tides; basic instrumentation in field work. 2 hrs. lec., 2 hrs. lab. Offered in spring. Prereq: ESCI 261 and PHYS 232 or 132

ESCI 365: 3 s.h.

Dynamical Physical Oceanography

Fluid motion in rotating systems; principal balance and modifications; conservation of vorticity; quasi-geostrophy; wind-driven and thermohaline circulation; currents and eddies; classical tidal theory; generation and propagation of surface waves. 2 hrs. lec., 2 hrs. lab. Offered periodically. Prereq: ESCI 364. Coreq or Prereq: MATH 365 and PHYS 312.

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 in spring of even years. Prereq: ESCI 261.

ESCI 465 or BIOL 495 or MAR. SCI. 464: 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 during summer at Marine Science Consortium field station. Prereq: ESCI 261 and BIOL 211 and BIOL 221.

ESCI 466 or MAR. SCI. 451: 3 s.h.

Coastal Environmental Oceanography (P)

The interaction of chemical, physical, geological and ecological ocean processes as applied to coastal environments, emphasis on environmental management issues. 2 hrs. lec., 3 hrs. lab. Offered only in summers at Marine Science Consortium field station. Prereq: ESCI 261; COMM 110, ENGL 110 and junior status.

ESCI 467: 3 s.h.

Engineering Applications in the Coastal Zone

The application of coastal processes and engineering practices in order to solve coastal zone management issues; practical problems in wave forecasting/hindcasting and coastal zone responses to storms and human modification. Alternative methods used to mitigate coastal erosion processes. Introduction to coastal structures. 3 hrs. lec. Prereq: ESCI 326, 342 or 362.

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 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 in fall of even years. Prereq: ESCI 221 or 241 or 261.

ESCI 282: 3 s.h.**FORTRAN 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 in fall. Prereq: MATH 211 and PHYS 231.

ESCI 380: 3 s.h.**Remote Sensing and Image Interpretation**

Principles of remote sensing; fundamentals of image enhancement; radiative transfer equation; use of Landsat and NOAA environmental satellite data in earth sciences; 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.

ESCI 385: 3 s.h.**Global Change (W)**

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: ENGL 110; ESCI 241 or 261 or GEOG 230.

ESCI 386: 3 s.h.**IDL Programming for Advanced Earth Sciences Applications**

Overview of existing global data sets in geology, meteorology, and oceanography; HDF and Net CDF scientific data formats; use of Interactive Data Language (IDL) to analyze and display data. 2 hrs. lec., 2 hrs. lab. Offered in spring. Prereq: ESCI 282, 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 in spring of even years. Prereq: ESCI 342 or 364.

*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 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

School of Humanities and Social Sciences

Professor Smith, chairperson
 Professors Gumpfer, Suliman
 Associate Professors Madden
 Assistant Professor Baker

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 adviser, 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, students will find economics to be an especially attractive field to help them prepare for a future career. By virtue of its broad nature, economics readily widens students' choices to join the work force and/or pursue their graduate studies. Students who wish to join the work force, 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 course work 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 2 required related courses (6-8 credit hours): either 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 adviser, each student will select a concentration totalling 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 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.

Economics Minor: 18 s.h.

ECON 101, 102 and either ECON 318 or 319 plus three other courses in economics including one 300-400 level course.

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 non-majors 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 in fall.

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. Offered in 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 Offered in 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 BSE social studies major and for the minor. Offered in fall, spring. 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 in 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 in 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 in fall. Prereq: ECON 101; ENGL 110.

ECON 226: 3 s.h.

Area Studies (G3, W)

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 infrequently. Prereq: ECON 101 or 102; ENGL 110.

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 in 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, W)

Analysis of consumer theory, firm theory and market failure within the context of health economics. Emphasis on the institutions involved in health care provision, labor markets for health care professionals and market structure and government regulation. Offered in spring. Prereq: ECON 102; ENGL 110.

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; junior status; COMM 100, 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 in 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 in spring. Prereq: ECON 101, 102.

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 in fall. Prereq: ECON 101.

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 in 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: 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 in 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 in 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, W)

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 in spring. Prereq: ECON 101 and 102; ENGL 110.

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

School of Education

Associate Professor Ward, Chairperson
 Professors Desmond, McDowell, Smith, Stengel
 Associate Professors Deemer, Hanich
 Assistant Professors, Dietrich, Dreon, Seda, Scott
 Instructor Lauris

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 block 9 s.h. (EDFN 330, EDSE 321, one subject-specific instructional methods course and a field experience,) and;
3. Student teaching 12 s.h. (EDFN 461).

Refer to *Admission to Advanced Professional Studies and Certification* (Education Majors) in this catalog for more information.

COURSE DESCRIPTIONS

EDFN 111: 1 s.h.**Citizenship and Social Studies Seminar I: Content Connections**

Focused on social studies content connections. One of two citizenship/social studies seminars, designed especially for those who seek to become social studies teachers in middle and high schools. Offered annually.

EDFN 112: 1 s.h.**Citizenship and Social Studies Seminar II: Modes of Inquiry Across Social Studies Disciplines**

Focused on modes of inquiry in social studies disciplines. One of two citizenship/social studies seminars, designed especially for those who seek to become social studies teachers in middle and high schools. Offered annually.

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 in fall, spring.

EDFN 211: 3 s.h.**Foundations of Modern Education (D)**

American school system; contemporary and historical influences; significance of education in society; contemporary problems in education, opportunities and requirements of the profession. Must be taken simultaneously with EDFN 241. Includes urban 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. No credit given if credit earned in EDFN 130, 220, 230, 330/530, 333/533 or EDAR 330/530.

EDSE 321: 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. Students should arrange their schedules to allow for at least two half days per week for public school experiences during the course. Offered in fall, spring. Prereq: EDFN 211, EDFN 241. Admission to advanced professional studies. Must be taken simultaneously with EDFN 330 and one of the following: EDSE 433, EDSE 435, ENGL 485, FORL 480, MATH 405, EDTE 391.

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 in fall, spring. Must be taken as a block with EDSE 321 and the Teaching of Methods class required in each secondary certification program. For secondary education majors only. Admission to advanced professional studies. No credit given if credit earned in EDFN 130, 220, 230, 320/520, 333/533 or EDAR 330/530.

EDFN 333/533: 3 s.h.

Instructional Technology in Special Education

Provides special education pre-service teachers with experiences in the use of technology for teaching and learning. Topics include basic computer systems (Macintosh and Windows® platforms), evaluating instructional software for special needs students, computer applications software (word processing, spreadsheets, draw, paint and data bases), telecommunications (Internet and email), multimedia presentations, integrating technology into the curriculum and field experiences. Offered in fall, spring. No credit given if credit earned in EDFN 130, 220, 230, 320/520, 330/530 or EDAR 330/530.

EDFN 376: 3 s.h.

Whose School Is it, Anyway? The Struggle for Equity in American Schooling (D)

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 annually.

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 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 students' area of interest/major is required. Offered in 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 in fall, spring. Prereq: EDFN 211, 241. Admission to Advanced Professional Studies. Must be taken simultaneously with EDSE 321 and EDFN 330.

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 in fall. Prereq: EDFN 211, 241. Admission to Advanced Professional Studies. Must be taken simultaneously with EDSE 321 and EDFN 330.

EDSE 461: 12 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 in 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. Admission to Advanced Professional Studies. (See *Academic Policies: Student Teaching, Application and Eligibility: Student Teaching, Transfer Students.*)

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.

Urban Education Program. 15 to 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. Prereq: ELED Majors - ELED 100, SPED 101.

Secondary Education Majors: You must have declared as your major.

If you have already taken EDFN 211 and 241 you do NOT qualify for the Urban Education Program.

ELECTRONICS/CONTROL SYSTEMS TECHNOLOGY

See Industry & Technology

ELEMENTARY & EARLY CHILDHOOD EDUCATION

School of Education

Associate Professor West, chairperson

Professors Gray-Schlegel, Kerper, Meckley, Topping, Wenrich

Associate Professors Heilshorn, Hoffman, King, Rudden

Assistant Professors Anthony, Colabucci, P. Himmele, W. Himmele, Hossain, Labant, Nell, Shettel, Valle

Major changes to the various certifications, and to certification programs are anticipated at the direction of the Pennsylvania Department of Education. Please consult with your academic adviser.

The program in elementary education is designed to provide the student with an in-depth knowledge of subject matter, appropriate knowledge of pedagogy and extensive and varied field experiences. Students who complete the elementary education program at Millersville University receive a Bachelor of Science in Education degree and may apply for a Pennsylvania Instructional I teaching certificate. Students are strongly urged to complete an academic minor from the list of minors available at Millersville University.

Dual Certification in Elementary Education and Early Childhood Education

Students may elect to earn dual certification in elementary education (K-6) and early childhood education (N-3). This additional certification would allow students to teach, as well, children from preschool through 3rd grade. Students earning the additional early childhood certification complete the following courses with a C (2.0) or better in each course: ELED 210, 312, 313, 314, 315, PSYC 227. These students need to complete 3 credits of elementary education electives.

Dual Certification in Elementary Education and Special Education

Students may elect a double major (elementary education and special education) with dual certification (elementary education and special education) through a cooperative program offered by both academic departments. Students may then apply for a Pennsylvania Instructional I teaching certificate in elementary education (K-6) and a certificate in special education allowing students to teach children from preschool through 12th grade (N-12 or ages 3-21), specifically individuals identified as developmentally delayed, learning disabled, mentally retarded, behaviorally disordered, autistic or pervasively developmentally disordered, physically disabled, health impaired, neurologically impaired or multiply handicapped.

Elementary Education Major with Science Option

Students may elect to complete the elementary education major with a science option. The science option has a 16-credit minimum (in addition to two natural science courses completed for G2 requirements) including BIOL 100, CHEM 101 or 103, ESCI 101 or 102 or 104 or 107, PHYS 131 and PHYS 117. Students completing the science option will be well prepared to teach science in intermediate grades and upon satisfying state licensure requirements at the middle school level.

Practicum experiences in the local schools are required as early as the freshman year and culminate with a semester-long student teaching assignment(s) in the elementary school classroom. Students may complete this requirement in a variety of settings which include urban, suburban and rural schools, or possibly schools in different cultural settings, such as Navajo reservation schools or schools in foreign countries. Current Pennsylvania regulations and standards mandate that one student teaching assignment be completed within a Pennsylvania school.

COURSE REQUIREMENTS

Elementary Education Major (B.S. Ed.): 120 s.h.

K-6 Certification in Elementary Education

Major Sequence Requirements: ELED 100, SPED 312, EDFN 320, ELED 376, EDUC 333 and 9 credits of elementary education electives.

Foundations Block: EDUC 220, EDFN 211 and EDFN 241. Prereq: ELED 100 or SPED 101 with grades of C (2.0) or higher.

Students complete Foundations of Modern Education (EDFN 211), Psychological Foundations of Teaching (EDFN 241) and Foundations of Reading

(EDUC 220) and examine the role of the teacher, the learner, the school environment and the classroom as a social setting. A practicum experience of considerable length allows students to make application of their new knowledge.

Required Related Courses: Art 141, MATH 104, MATH 105, MUSI 103 or MUSI 104, WELL 352.

Professional Block: ELED 325, 340, 351, 361 and EDUC 305.

The professional semester is an integrated program of professional education courses normally completed in the student's junior or senior year. It is composed of 16 s.h. A practicum experience in the local schools is required in conjunction with the four courses of the elementary education professional block.

Before enrolling in professional block the student must satisfy the following prerequisites:

1. Gain admission to APS with a minimum of 60 credit hours and an overall Grade Point Average (GPA) of 3.0 or higher.
2. Earn a qualifying score on the following Pennsylvania Certification (PRAXIS I) tests:
 - PPST Reading
 - PPST Writing
 - PPST Mathematics
3. Earn a C (2.0) or higher in ENGL 110 and pass an additional 3 credit English literature course.
4. Earn a grade of C (2.0) or higher in all courses completed in the major, including required related courses.
5. Pass a laboratory course in science.
6. Satisfactory Act 34 (criminal record check) report, satisfactory Act 151 (child abuse history clearance) report, satisfactory FBI clearance and a completed background information sheet on file with the Field Services Office.

Refer to *Admission to Advanced Professional Studies and Certification* in this catalog for more information.

Prerequisites for Student Teaching

A student shall successfully complete with a C (2.0) or higher all major required courses and attain an overall GPA of 3.0 or higher in all University courses. In addition, the student must have earned grades of C (2.0) or higher in each course in the professional block.

Millersville Students Applying to the Major: If space is available, admission to the elementary education major from other majors, including the undeclared major, for students who transferred to Millersville University with 15 or more credits is upon:

1. Completion of 15 s.h. of credit at Millersville University with a grade point average (GPA) of 2.75 or higher.
2. Qualifying scores for Pennsylvania on the PRAXIS I PPST tests.
3. A passing score on the Basic Skills Test (BST) administered by the Department of Mathematics.
4. A successful interview.
5. Approval of the chairperson of the elementary and early childhood education department.

If space is available, admission to the elementary education major from other majors, including the undeclared major, for students who entered or transferred to Millersville University with 14 s.h. or fewer credits is upon:

1. Completion of 30 s.h. of credit at Millersville University with a grade point average (GPA) of 2.75 or higher.
2. Qualifying scores for Pennsylvania on the PRAXIS I PPST tests.
3. A passing score on the Basic Skills Test (BST) administered by the Department of Mathematics.
4. A successful interview.
5. Approval of the chairperson of the elementary and early childhood education department.

COURSE DESCRIPTIONS

EDUC 090: 3 s.h.

Improvement of Reading, Communication and Study Skills

Improvement of reading, communication and study skills for students requiring additional instruction prior to formal University courses. The course is developmental in nature and will not be applicable toward University requirements. After successfully completing this course, a student would be prepared to begin courses at the 100-level or above. Offered in summer.

ELED 100: 3 s.h.

Introduction to Elementary Education

A realistic introduction to teaching in the elementary school. Throughout the course, student thinking is encouraged as prospective teachers reflect on goals and societal expectations of elementary schools, essential teacher knowledge, attitudes and skills, teacher roles and responsibilities and teachers as planners and designers of curriculum. Students contemplate the consequences of critical teaching decisions on grouping, content and classroom management strategies. In the concurrent field experience, students reflect on their ability to cope with classroom reality as they affirm or deny their choice of teaching as a profession. Offered in fall, spring.

ELED 210: 3 s.h.

The Young Child and the Curriculum

An overview of the field of early childhood education. Historical and philosophical influences on past and current approaches to teaching young children are traced and analyzed. The developmental needs and characteristics of the young child, with emphasis on the preprimary level, are related to current curriculum programs and practices. Emphasis on the necessity of using developmentally appropriate learning materials and teaching strategies. Weekly observation/participation in a pre-school setting integrates theory with practice and affords the student an opportunity to evaluate his/her commitment to a career in early childhood education. For early childhood certification students only. No credit given if credit earned in EDUC 215. Offered in fall, spring.

EDUC 215: 3 s.h.**The Young Child and Education**

Elective for an education major, but not for an early childhood education certification student. No credit given if credit earned in ELED 210. Overview of the young child in educational settings. Emphasis on developmentally appropriate teaching techniques, learning materials and environments. Focus on developmental needs, individual characteristics and socio-cultural considerations. Weekly observation/participation in an early childhood setting applies theory to practice. Offered annually.

EDUC 220: 3 s.h.**Foundations of Reading**

Introduces topics in the field of teaching reading, 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 in fall, spring. Prereq: ELED 100 or SPED 101.

EDUC 305: 1-3 s.h.**Field Experiences**

Specific work and study assignments constituting the field experience will be developed. Regular discussions, conferences and group seminars will be conducted by faculty members and field supervisors to clarify generalizations that link practice to theory. The assignments will be in public schools. Offered in fall, spring.

ELED 312: 3 s.h.**Seminar: Prekindergarten**

A practical application of prekindergarten teaching philosophies and methods. Includes field experiences in nursery schools, Head Start, public pre-K classrooms and/or day care centers. Includes group discussions, conferences, reading, independent study. Developmental characteristics of pre-K children and curriculum experiences studied in relation to research, program models and philosophies that influence early childhood programs. Emphasis on importance of play, the learning environment, behavior observation. For early childhood certification students only. Offered in fall, spring and alternate summers. Prereq: ELED 210.

ELED 313: 3 s.h.**Seminar: Kindergarten**

A practical application of kindergarten teaching methods. Includes field experiences in a kindergarten classroom. Includes group discussions, conferences, reading, independent study. Emphasis on programs and materials, use of screening and assessment procedures/tools toward developing a program that allows individualization, cultural diversity and the value of play in the K-3rd grade learning experience. For early childhood certification students only. Offered in fall, spring and alternate summers. Prereq: ELED 210.

ELED 314: 3 s.h.**The Parent-Teacher Relationship in Early Childhood Education (D, W)**

A concentration on cooperation between teachers and parents of young children. Considers issues relevant to successful home-school-community relationships, such as home-based early childhood programs, infant-toddler development and education, parents as teachers, home-school communication techniques, conferencing, parent involvement in the classroom, family crisis and family agency services. For early childhood certification students only. No credit given if credit earned in EDUC 316. Offered in fall, spring. Prereq: ELED 210, ENGL 110.

ELED 315: 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 in fall, spring.

EDUC 316: 3 s.h.**The Parent-Teacher Relationship in the Elementary School (D, W)**

Elective course for an education major, but not for an early childhood education certification student. No credit given if credit earned in ELED 314. Focus on cooperation between teachers and parents in the elementary school. Considers issues relevant to successful home-school-community relationships, such as parenting education, parents as teachers, home-school communication techniques, conferencing and parent involvement in the classroom. Covers research, information and teaching techniques for dealing with family issues and crisis as they affect students. Offered annually. Prereq: EDUC 215 or PSYC 227, ENGL 110.

EDUC 323: 3 s.h.**Teaching Reading in the Content Areas (W)**

An elective 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 in fall, spring. Prereq: EDUC 220; ENGL 110.

ELED 325: 6 s.h.**The Teaching of Literacy: Processes, Skills and Strategies**

Pedagogy as an interrelated and integrated format of reading, writing, listening and speaking. Understandings, teaching strategies and techniques presented are consistent with national and state standards, assessments and curriculum frameworks. Offered in fall, spring. Prereq: 60 s.h. and admission to Advanced Professional Studies (APS).

EDUC 333: 3 s.h.**Literature for Children and Young Adolescents**

Introduces the genres of literature for children and young adolescents from birth through 14 years of age. Students examine the work of renowned authors and illustrators. Response to literature and the selection of books for the classroom receive emphasis. Prereq: EDFN 241 or PSYC 227 or 228. Offered in fall and spring.

ELED 340: 3 s.h.**Teaching of Social Studies**

An overview and examination of social studies curriculum for the elementary classroom. Emphasis on philosophy, methods and materials for the teaching of social studies. Special emphasis on integration of the social sciences, especially economics, history and geography. Offered in fall, spring. Prereq: 60 s.h. and admission to Advanced Professional Studies (APS).

ELED 351: 3 s.h.**Teaching of Mathematics**

For elementary education majors with emphasis on modern curricula and methods of teaching mathematics in elementary schools. Examinations of texts, supplementary teaching materials and teaching devices. Study of research findings. Offered in fall, spring. Prereq: MATH 105, 60 s.h. and admission to Advanced Professional Studies (APS).

ELED 361: 3 s.h.**Teaching of Science**

An overview of the content and processes included in an elementary school science program, plus a study of methodology and instructional skills appropriate to the elementary school setting. Offered in fall, spring. Prereq: laboratory course in the sciences, 60 s.h. and 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 infrequently. Prereq: ENGL 110.

ELED 376: 3 s.h.**Assessment for Instructional Planning (W)**

Principles, procedures and use of traditional and alternative testing and measurement to make curricular decisions to enhance student learning in the elementary classroom. Emphasizes analysis of student learning to inform teacher decision making. Prereq: ENGL 110, EDUC 220, EDFN 211, EDFN 241, MATH 104. Coreq: MATH 105. Offered in fall, spring.

EDUC 376: 3 s.h.**Strategies for Classroom Management**

Covers contemporary classroom management in today's elementary schools. Emphasis on prevention of management breakdown and developing a positive success-based environment. Offered in fall, spring.

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 in fall, spring. Prereq: ENGL 110.

ELED 405: 3 s.h.**Creative Activities in the Elementary School**

General theory of creativity. Consideration of the basic principles of creative teaching as they relate to the various curricular areas in the elementary school. Activities and experiences applied to creative teaching. Offered in spring, summer.

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.

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 in fall, spring. Prereq: EDUC 220; ENGL 110.

EDUC 425: 3 s.h.**Prevention and Correction of Reading Problems**

The prevention and correction of reading problems. Through practicum experiences students must then make some instructional decisions about specific children with reading disabilities. Offered infrequently. Prereq: EDUC 220; ENGL 110.

EDUC 430: 3 s.h.**Teaching Reading Through Writing (W)**

Instruction in the integration of reading and writing in the elementary grades. Discussion of the influence of the writing process on reading. Offered annually. Prereq: EDUC 220; ENGL 110.

EDUC 433: 3 s.h.**Gender and Race Issues in Children's Literature (P)**

Children's literature will be examined in the light of recent psychological, sociological and educational research on sexism and racism. Offered in fall, spring. Prereq: COMM 100, ENGL 110, junior status.

EDUC 434: 3 s.h.**Creative Dramatics**

Developing programs in creative dramatics for the classroom teacher who wishes to gain insight into the dramatic process and learn how this process can stimulate language study and enhance the development of a language arts program. Offered infrequently.

EDUC 451: 3 s.h.**Measurement, Problem Solving and the Metric System**

Implementation of the metric system in schools, techniques for problem solving and applications of mathematics to the world of measurement. Offered infrequently.

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.

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 in fall, spring.

REQUIRED RELATED COURSES**ART 141: 3 s.h.****Fundamentals of Studio Art****WELL 352: 3 s.h.****Health Education in Elementary Schools****MATH 104: 3 s.h.****Fundamentals of Math I****MATH 105: 3 s.h.****Fundamentals of Math II****MUSI 103: 3 s.h.****Language of Music I**

or

MUSI 104: 3 s.h.**Language of Music II****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 in summer.

ELED 505: 3 s.h.**Creative Activities in the Elementary School**

Offered in spring, 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 534: 3 s.h.**Creative Dramatics**

Offered periodically.

EDUC 535: 3 s.h.**Literature for Children and Young Adolescents**

Offered in fall, spring.

EDUC 536: 3 s.h.**Picture Book Communication**

Offered infrequently.

EDUC 551: 3 s.h.**Measurement, Problem Solving and the Metric System**

Offered infrequently.

EDUC 561: 3 s.h.**Second Language Acquisition: Theory, Programs and Assessment**

Offered fall, spring.

EDUC 562: 3 s.h.**Methods for Teaching English Language Learners**

Offered fall, spring.

EDUC 563: 3 s.h.**Linguistic and Cultural Diversity in the Classroom**

Offered fall, spring.

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 periodically.

ELED 576: 3 s.h.**Assesment for Instructional Planning**

Offered fall, spring.

EDUC 586-589: 3 s.h.**Topics in Education**

Offered periodically.

ENGINEERING

See Chemistry and Physics

ENGLISH

School of Humanities and Social Sciences

Professor Schneller, chairperson

Assistant Professor Corkery, assistant chairperson

Professors Carballo, Kelly, T. Miller, Sheaffer, Shields

Associate Professors Craven, Duncan, Halden-Sullivan, Mayers, McCollum-Clark, S. Miller, Skinner

Assistant Professors Alden, Archibald, Corkery, Duba, Farkas, Jakubiak, Rineer, Rosenthal, Shea, Shin, Widmayer, Zhang

Instructors Anderson, Dougherty

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 238H) 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 238H or 239H), 233 or 235, 237, 311 and 321, with a minimum ENGL GPA of 2.0. These courses 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) is required for graduation. If English composition competency is satisfied by examination without credit, one additional English elective is required.

All B.A. students must complete a minor. All students also may elect to pursue options in Comparative Literature, English as a Second Language, Film Studies, Linguistics and Print Journalism.

Cooperative education courses provide opportunities for English majors to apply their field of study in professional contexts. Consult your adviser or the Office of Community and Academic Partnerships (CAP) for more information.

The department participates in the pre-law advisory committee, School of Humanities and Social Sciences. English majors planning careers in law should contact the department's pre-law adviser, Dr. S. Miller.

In planning a course of study, English majors must consult with their departmental academic advisers 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.

COURSE REQUIREMENTS

English Major (B.A.): 120 s.h.

ENGL 220, 233, 231 or 238H 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 adviser. 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 232 (or 238H or 239H), 233 or 235, 237, 311, 321, 405, 486; 3 s.h. of literature (400 level) prior to 1800; 3 s.h. of American literature (400 level); 3 s.h. of literary genre (400-level); 9 s.h. of English electives. Required related courses: 3 s.h. of art, music or theatre; 3 s.h. of history; EDFN 211, 241 and 330; EDSE 321; ENGL 487 (to be completed prior to the student teaching semester) and EDSE 461.

At least one required or elective course in the degree program must contain a substantial component in female authors or writers of color, and one course must satisfy the non-print media competency requirement. A list of courses fulfilling this requirement is available in the English department or on the English website. Secondary education students must maintain a minimum GPA of 3.0 at the time they have enrolled in Advanced Professional Studies and Certification.

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 Criticism

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 (English) or Dr. Leroy Hopkins (Foreign Languages).

English Major (B.A. or B.S. Ed.)

English as a Second Language (E.S.L.) 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 E.S.L. students are encouraged to seek opportunities for E.S.L. tutoring in addition to electing foreign language course work. Also, E.S.L. 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.

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 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 free 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 318 Technical Skills for Journalists - or -
ENGL 330 Computer-Assisted Journalism

Electives 3 s.h.

ENGL 250 The Press and Society
ENGL 318 Technical Skills for Journalists
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 concentrated study in the discipline of writing, specializing in sub-fields such as the history of rhetoric and composition, literacy, theories of writing pedagogy, and writing and multi-media.

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 a 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 342: Theories of Rhetoric
 COMM 403: Persuasion
 COMM 430: Culture and the Semiotics of Communication

Candidates will select one of the following capstone courses:

ENGL 400: Cooperative Education
 ENGL 491: Thesis (3-credit)

Print Media Studies Minor

Track 1 required for English Majors taking Print Journalism Option 18 s.h.

English majors who have chosen the option in print journalism and also wish to receive the minor in print media studies 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 print media studies that they have used to meet requirements for the print journalism option.

Print Media Studies Minor

Track 2 required for Non-English Majors or English Majors without Print 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, 328, 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, 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 342, 403, 430, GERM 460, FREN 460, SPAN 460 (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 010: 3 s.h.

Fundamentals of Writing

Instruction in the fundamentals of writing standard English. Intended primarily for students who do not demonstrate proficiency, as measured by departmental examination. Students are evaluated on their proficiency, not on progress, by the conclusion of the course. Prereq: permission of instructor. Students who must take ENGL 010 earn credits and the grade is counted in the cumulative grade point average, but ENGL 010 course credit cannot be counted towards fulfillment of the baccalaureate or associate degree.

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 in fall, spring.

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 in 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.

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 in fall, spring.

ENGL 231: 3 s.h.**World Literature (G1)**

Survey of literary development from earliest records to 1650. Emphasis on historical, aesthetic and philosophical aspects of world literature. Offered in fall, spring.

ENGL 232: 3 s.h.**World Literature II (G1)**

Continuation of ENGL 231 from 1650 to present. ENGL 231 is not a prerequisite. Offered annually.

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 in fall, spring.

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 annually.

ENGL 235: 3 s.h.**Early American Literature (G1)**

Survey of American literature from colonial times to 1865. Offered in fall, spring.

ENGL 236: 3 s.h.**Later American Literature (G1)**

Survey of American literature from 1865 to present. ENGL 235 is not a prerequisite. Offered in fall, spring.

ENGL 237: 3 s.h.**Introduction to Techniques of Literary Research and Analysis**

Textual, critical and rhetorical analyses of literary genres. Designed to familiarize the student with literary theory and interpretation of genres through research and analytical writing. Offered in fall, spring.

ENGL 238H: 3 s.h.**The Western Literary Tradition I (G1, W)**

Major works of the Western literary tradition from the Ancient World through the Renaissance. Offered annually. Prereq: ENGL 110, Member University Honors College or 3.35 GPA.

ENGL 239H: 3 s.h.**The Western Literary Tradition II (G1, W)**

Major works of the Western literary tradition from the Neoclassical period through Modernism. Offered annually. Prereq: ENGL 110, Member University Honors College or 3.35 GPA.

ENGL 240/240H: 3 s.h.**Introduction to Film (G1, W)**

Interpretation of film as an art form, including technical and artistic aspects of film making. Genres, auteur theory and other theoretical approaches to cinema. Technology-intensive course. Offered in fall, spring. Prereq: ENGL 110.

ENGL 250: 3 s.h.**The Press and Society (G1, W)**

In-depth analysis and critical evaluation of print media in society, including responsibilities, functions, influences and operations of the press in society. Covers press and public freedoms, press ethics and codes of conduct. Offered in 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. Prereq: ENGL 110

ENGL 280: 3 s.h.**Rhetoric of the Color Line (D, W)**

Introduces student 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. 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 references based on scientific knowledge and historical, social or cultural patterns. Emphasis on multiple lines of inquiry or analysis. Offered in spring. 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: 24 s.h. and permission of COOP coordinator. Prereq: ENGL 110.

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)**

Practice in expository, descriptive and argumentative writing through reviews, critical reports, essays and analyses. 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.

ENGL 313: 3 s.h.**Fundamentals of Journalism (AW)**

Journalistic writing with emphasis on news and feature writing for the print media. Includes course work in journalistic law and ethics. Offered in fall, spring. Prereq: ENGL 110 or equivalent, 60 s.h.

ENGL 315: 3 s.h.**Advanced Reporting (W)**

A course in reporting news and features that emphasizes experience in the field completing authentic journalistic assignments. Includes the study of traditional and nontraditional journalistic forms. Offered in fall. 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**

Principles and practices of editing for publication. Develops skills in improving copy, writing headlines and cutlines, selecting and sizing photographs, page design and layout. Includes legal, ethical and philosophical aspects of editor's role. Offered annually. Prereq: ENGL 110 or equivalent.

ENGL 318: 3 s.h.**Technical Skills for Journalists**

Focus on shorthand, journalistic network searches and digital-media applications. Course is an elective for the print media studies minor. Offered periodically. Prereq: ENGL 110 or equivalent.

ENGL 321: 3 s.h.**Transformational Grammar (G1)**

Analysis of the syntax of American English from the perspective of generative linguistics. Offered periodically. 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 and analysis of features and advertising for print media, including features behind the news. Includes assessment and selection of appropriate illustrations and page design. Offered periodically. Prereq: ENGL 313.

ENGL 328: 3 s.h.**Ethics in Print 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 Journalism**

Covers the use of email for journalistic purposes, accessing websites and databases, writing follow-up stories based on electronically acquired data, plus contacting identified sources. Includes digital editing techniques. Prereq: ENGL 313.

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 332: 3 s.h.**Literature of the Bible**

A literary survey of the Bible in English emphasizing narrative, didactic and poetic forms within historical contexts. Not a course in religion. Offered infrequently. 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 in 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 in spring. Prereq: COMM 100, 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, W)**

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. Prereq: ENGL 110

ENGL 342: 3 s.h.**Reading and Writing for Civic Change (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. Prereq: ENGL 110.

ENGL 347: 3 s.h.**Studies of Ethnicity in Film-Ethnicity (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. Technology intensive course. Offered biannually. Prereq: ENGL 110, 60 credit hours.

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. 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. Prereq: ENGL 110.

ENGL 403: 3 s.h.**Chaucer**

Chaucer's life, times and important works; study of the language and pronunciation. Prereq: ENGL 110.

ENGL 404: 3 s.h.**The English Renaissance**

Nondramatic literature during the late 15th and 16th centuries from "Morte d'Artur" through the early 17th century, prose and verse during the reigns of Lancaster, York, Tudor. Prereq: ENGL 110.

ENGL 405/405H: 3 s.h.**Shakespeare**

Shakespeare's life, works and times; detailed consideration of major plays. Prereq: ENGL 110.

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.

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.

ENGL 411: 3 s.h.**Romantic Literature**

Rise of romanticism in later 18th century to the beginning of Victorianism. Emphasis on poetry and criticism between 1798 and 1832. Prereq: ENGL 110.

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.

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.

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.

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.

ENGL 416: 3 s.h. (G1, W)**The Woman Writer and Her World**

Chronological study of British women writers of poetry, prose, criticism and/or drama. Authors studied varies. Prereq: ENGL 110.

ENGL 418: 3 s.h. (G1, W)**Literature of Scotland and Ireland: 18th Century to the Present**

Survey course in the literature of Scottish and Irish writers. Authors studied varies. 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.

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.

ENGL 423: 3 s.h.**Development of the American Novel: 19th Century**

Narrative fiction from early and middle parts of nineteenth century to "fin de siecle." Emphasizes the Romance, the Gothic tale and the rise of the novel. Prereq: ENGL 110.

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.

ENGL 425: 3 s.h.**Modern American Fiction, 1920-1945**

Important American fiction writers of the twentieth century with emphasis on major developments in ideas and techniques. Special attention to Anderson, Fitzgerald, Hemingway, Faulkner, Steinbeck and others. Prereq: ENGL 110.

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.

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.

ENGL 429: 3 s.h.**Seminar in Selected American Authors**

Intensive study of the works of selected American authors. May be taken more than once for credit. Prereq: ENGL 110.

ENGL 430: 3 s.h.**Studies in Ethnic American Literature Since 1945 (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 every other spring semester. Prereq: COMM 100, ENGL 110 and junior status.

Comparative Literature, Genre, Literary Criticism

All 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.

ENGL 435: 3 s.h. (P)**Journalism Through Women's Perspectives**

Literary journalism, a genre that combines literary techniques with journalistic techniques, that focuses on the circumstances of women from a variety of cultures as writers and subjects of the genre. Offered periodically. Prereq: Junior status and COMM 100, ENGL 110.

ENGL 441/441H: 3 s.h.**Poetry**

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.

ENGL 442: 3 s.h.**Drama**

Seminar with emphasis on drama as a literary genre. Emphasis on masterpieces of drama in the Western world. Prereq: ENGL 110.

ENGL 443: 3 s.h.**Prose Fiction**

Seminar examining fictional narratives including the novel, creative nonfiction, novella and short story that reflects comparative perspective. Prereq: ENGL 110.

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, historico-cultural context and critical approaches. Offered annually. Prereq: ENGL 110

ENGL 451: 3 s.h.**Literary Criticism and Theory**

Seminar on major critics and theorists from Plato and Aristotle to selected modern critics. Explores representative critical trends and controversies. Prereq: ENGL 110.

Linguistics

All classes listed in the Linguistics section are offered periodically.

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. 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. 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. Prereq: ENGL 110 and 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. Prereq: ENGL 311 or 312 or 313 or 316.

ENGL 471: 3 s.h.**Creative Writing**

Extensive practice in writing 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 in spring. Prereq: ENGL 313.

*Film***ENGL 481: 3 s.h.****History of Film (W)**

Viewing/discussion of 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)**

Viewing/discussion of significant American films in relation to social and historical context. Technology-intensive course. Offered biannually in spring. Prereq: ENGL 110.

ENGL 483: 3 s.h.**Politics, Film and Electronic Media (P)**

Exploration of the relationships between media, history, politics and people during the 20th and 21st centuries. 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 twentieth century. Includes American and foreign films that focus on technology and/or address issues raised by technology. Special focus on directors Kubrick and Gilliam. Technology-intensive course. Offered biannually in spring. Prereq: ENGL 110, 60 credit hours.

*Education***ENGL 485: 3 s.h.****Teaching Secondary School English**

Specialized problems of English instruction. Required for B.S.Ed. in English. Offered in fall, spring. Prereq: Successful completion of the social and psychological foundations block and admission to Advanced Professional Studies. Must be taken during semester immediately prior to EDSE 461, Student Teaching and Seminar. Must be taken concurrently with EDSE 321.

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 BSE in English. Course should be taken prior to Advanced Professional Studies block (preferably as juniors or seniors). Offered in fall, spring.

ENGL 487: 3 s.h.

Seminar in Teaching Writing

Development, analysis and evaluation of instructional materials and approaches appropriate to the students being taught by each student teacher with special emphasis on understanding and implementing The Pennsylvania Comprehensive Reading/Communication Arts Plan. Must be taken prior to student teaching. Offered in fall, spring. Prereq: ENGL 110.

SPECIAL ACADEMIC OPPORTUNITIES

Honors Courses

ENGL 110H, ENGL 238H, ENGL 239H, ENGL 240H, 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 and/or Departmental Honors

ENGL 498: 1-3 s.h.

For information on independent study and departmental honors, see the *Special Academic Opportunities* section and your adviser.

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.

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, occupational safety & environmental health 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. In addition to satisfying course requirements, an EHEM student will, in consultation with a minor adviser, develop a portfolio of their best course and research products. The portfolio will be used to gauge progress in the minor and will serve the student well in seeking emergency management positions after graduation.

Environmental Hazards and Emergency Management Minor: 18 s.h.

Required Courses: ESCI 101, OSEH 120, SOCY 313, GEOG 372. Electives: Choose two from CHEM 101, OSEH 221, GEOG 295, EHEM 498.

REQUIRED AND RECOMMENDED EHEM COURSES (Course descriptions may be found under the appropriate departmental listing of courses.)

Required Courses

ESCI 101: 3 s.h.

Earth Systems and Natural Hazards

OSEH 120: 3 s.h.

Introduction to Occupational Safety

SOCY 313: 3 s.h.

Sociology of Disaster

GEOG 372: 3 s.h.

Urban and Regional Planning

Elective Courses

CHEM 101: 3 s.h.

Chemistry! Better Things for Better Living

OSEH 221: 3 s.h.

Industrial Fire Prevention, Protection and Control

GEOG 295: 3 s.h.

Geographic Information Systems

EHEM 498: 3 - 6 s.h.

Internship or Special Independent Project in Emergency Management (contracted with any of the participating departments)

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

GEOG 281: 3 s.h.

Map Interpretation and Analysis

GOVT 112: 3 s.h.

State and Local Government

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

ENVIRONMENTAL STUDIES

Five multi-disciplinary 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: 21 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

OSEH 435: 3 s.h.

Environmental Technology

ENVI 495: 3 s.h.

Environmental Clinic

Elective Courses (Choose Two)**ECON 316: 3 s.h.****Public Finance****GEOG 372: 3 s.h.****Urban and Regional Planning****SOCY 313: 3 s.h.****Sociology of Disaster****Industrial and Environmental Health Minor: 21-22 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****BIOL 356: 5 s.h.****Functional Human Anatomy****ENVI 495: 3 s.h.****Environmental Clinic****Elective Courses (Choose One)****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 349: 3 s.h.****Chemistry of the Atmosphere (P)****Land Use Minor: 21 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 295: 3 s.h.****Geographic Information Systems****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:

GEOG 230: 3 s.h.**Physical Geography****ESCI 225: 3 s.h.****Geomorphology**

Choose One of the Following:

GEOG 227: 3 s.h.**Urban Geography****GEOG 305: 3 s.h.****Geography of Energy (W)**

GEOG 333: 3 s.h.

Biogeography

ESCI 426: 3 s.h.

Groundwater Geology

OSEH 220: 3 s.h.

Legal Aspects of Environmental Safety

Quantitative Methods in Environmental Science Minor: 21-22 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:

ESCI 386: 3 s.h.

IDL Programming for Advanced Earth Sciences Applications

GEOG 295: 3 s.h.

Geographic Information Systems

Choose Four of the Following:

ESCI 267: 3 s.h.

Field Methods in Oceanography

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 449: 3 s.h.

Plant Communities

OSEH 321: 4 s.h.

Environmental and Industrial Hygiene I

ITEC 465: 3 s.h.

Instrumentation and Control

Water Resources Minor: 22 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

CHEM 375: 4 s.h.

Environmental Chemistry

ESCI 329: 3 s.h.

Aqueous Geochemistry (W)

ESCI 426: 3 s.h.

Groundwater Geology

BIOL 445: 3 s.h.
Aquatic Biology

ENVI 495: 3 s.h.
Environmental Clinic

COURSE DESCRIPTIONS

Course descriptions are found in the appropriate departmental section.

ENVI 330: 3 s.h.
Environmental Statistics and Risk Assessment

Methods of statistical analysis and risk assessment applied to environmental science including: characteristics of environmental quality data; statistical measures and distributions; identifying system changes; hypothesis testing of environmental quality; risk, hazards and exposures; bioassays. Team-taught. Offered periodically. Prereq: MATH 130 or 235 or 333 or BIOL 375.

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 new General Education curriculum (for students entering fall 2008).

FOREIGN LANGUAGES

School of Humanities and Social Sciences

Associate Professor Gaudry-Hudson, chairperson
 Professor Hopkins

Associate Professors Börger-Greco, Moine, Nimmrichter, Rivera-Hernández
 Assistant Professors Antolín, Valentin-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 non-majors 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.

Attention is called to the Millersville University Foreign Language Summer Institutes, in which graduate students live together in their own schools and speak the foreign language at all times. Well-prepared undergraduate students may participate following their junior year with a recommendation from their department chairperson and adviser.

All students are required to take an oral proficiency interview at the end of their sophomore year.

All modern language majors are required to take, prior to graduation, an oral proficiency interview and to compile a portfolio. BSE students are required to take the official OPI and receive a rating of Advanced Low or higher prior to graduation.

STUDY ABROAD

Language majors considering spending their junior or senior year abroad at an international university are advised to discuss the matter with their advisers, the department of Foreign Languages study abroad advisers, 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, phone: (717) 872-3884 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, 311, 312, 351, 352, 470, plus courses in language, literature and civilization as approved by adviser. 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 adviser. 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). Required related courses: ENGL 220, one course each in history and the humanities related to the foreign language area of study with adviser's approval. Study abroad strongly recommended.

French, German or Spanish Major (B.S. Ed.): 120 s.h. Certification in Secondary Education

FORL 201, 202, 311, 312 or 313, 331 (or 332 or 333), 351, 352, 470 (with a grade of B- or higher) and 480, ENGL 220 and one course in history related to the foreign language area of study with the adviser's approval. Three courses (9 credits) in a second language. Certification may be earned in two language areas. Early planning with adviser is essential and study abroad is strongly recommended. For those seeking dual certification the 101 and 102 courses in the second language count toward certification.

In addition to the above, EDFN 211, 241 and 330; and EDSE 321 and 461 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.

German majors with the international business option will be prepared to pass the "Zertifikat Deutsch für den Beruf."

French majors have been successful in achieving the Paris Chamber of Commerce Certificate.

Spanish majors have been successful in achieving the Madrid Chamber of Commerce Certificate.

French, German, Greek, 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 adviser.) Greek and Latin minors are offered in cooperation with Franklin & Marshall College.

COURSE DESCRIPTIONS

NOTE: All courses designated HUMN (Humanities) are designed for non-majors and may be credited in the humanities and fine arts block (G1) as general education, subject to distribution limits, unless you are a foreign language major.

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 in 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 in spring. Prereq: FREN 101 or 2 years of h.s. 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 in 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 in 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 non-majors 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 in spring. 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 in spring. Prereq: FREN 311 or permission of instructor.

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 in fall. 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. Taped 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.

NOTE: The French section has an exciting, new way to earn some of your credits at the advanced level — in the virtual classroom. For more information, please contact Dr. Christine Gaudry-Hudson.

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 age of classicism in French; emphasis on Molière, Corneille and Racine. Outside readings. Offered infrequently. Prereq: FREN 311 and 312.

FREN 422: 3 s.h.

French Drama II

The life and works of representative dramatics of the 18th and 19th centuries, including Marivaux, Voltaire, Beaumarchais, Hugo, Musset. Offered infrequently. Prereq: FREN 311 and 312.

FREN 423: 3 s.h.

French Drama III

Symbolist drama, existentialist drama and the theater 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, 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 and EDFN 330. Offered in fall. Prereq: Admission to Advanced Professional Studies, FREN 470 or GERM 470 or SPAN 470.

FREN 490: 3 s.h.**Teaching of Foreign Languages****in the Elementary School**

Methodology, materials and techniques devised for teaching foreign languages to young children. Observation of FLES classes with opportunity for selected students to acquire teaching experience under guidance. Offered infrequently. Prereq: Applied Linguistics.

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.

NOTE: The graduate courses in French listed below are open to undergraduates with the recommendation of the adviser and consent of the instructor. (See the *Graduate Catalog* for course descriptions.) Undergraduate course number on left corresponds with graduate course number in parentheses.

FREN 401 (501): 3 s.h.**Modern Methods of Teaching French****FREN 403 (503): 3 s.h.****Activities for Class and Club****FREN 409 (509): 3 s.h.****Applied Linguistics****FREN 416 (512): 3 s.h.****Introduction to Phonetics****FREN 417 (513): 3 s.h.****Advanced Phonetics****FREN 441 (521): 3 s.h.****Functional Grammar Review****FREN 442 (522): 3 s.h.****Composition****FREN 443 (523): 3 s.h.****Stylistics and Composition****FREN 444 (524): 3 s.h.****Translation and Interpretation****FREN 445 (525): 3 s.h.****Advanced Oral Practice and Self Expression**

FREN 446 (541): 3 s.h.
History of France to 1789

FREN 447 (542): 3 s.h.
History of France from 1789 to the Present

FREN 451 (551): 3 s.h.
Geography of France, Physical and Economic

FREN 461 (561): 3 s.h.
Survey of French Art

FREN 462 (562): 3 s.h.
Survey of French Architecture

FREN 463 (531): 3 s.h.
Evolution of the French Language

FREN 471 (571): 3 s.h.
Aspects of Contemporary France

FREN 481 (581): 3 s.h.
Seminar in Medieval French Literature

FREN 482 (582): 3 s.h.
Seminar in Renaissance Literature

FREN 483 (583): 3 s.h.
Seminar in Seventeenth Century Literature

FREN 484 (584): 3 s.h.
Seminar in Eighteenth Century Literature

FREN 485 (585): 3 s.h.
Seminar in Nineteenth Century Literature

FREN 486 (586): 3 s.h.
Seminar in Twentieth 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 in 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 in spring. Prereq: GERM 101 or 2 yrs. of h.s. 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 in 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 in 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 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 non-majors with interest in foreign literature. May be selected by majors with consent of adviser to fulfill humanities course requirements. Offered in fall, spring. Prereq: ENGL 110.

HUMN 230: 3 s.h.**The Amish and Other Pennsylvania Germans (G1)**

The Amish and other Pennsylvania Dutch, 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.

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 301: 3 s.h.**Business German**

Advanced study of the four skills and translation. Extensive use of German language tapes and articles from business periodicals, supplemented by an introduction to business correspondence and grammar. Offered infrequently. Prereq: GERM 202 or placement exam.

GERM 311 and 312: 3 s.h. each**Survey of German Literature I & II**

Orientation to various periods of German literature from the earliest times up to the present. Lectures on outstanding literary figures. Reading and discussion of representative work. Prereq: GERM 202 or placement exam.

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 from prehistoric times to the present. Offered periodically. Prereq: GERM 202.

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 in fall (351) and spring (352). 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 periodically. Prereq: GERM 351, 352.

GERM 411: 3 s.h.**German Poetry I**

Study of representative poems from old high German to the death of Goethe. Biographical sketches of poets. Lectures on metrics and genres. Student research papers. Offered infrequently. Prereq: GERM 311 and 312.

GERM 412: 3 s.h.**German Poetry II**

From romanticism up to and including the present. Procedure similar to GERM 411. Question and answer periods based on research papers. Offered infrequently. Prereq: GERM 311 and 312.

GERM 421: 3 s.h.**German Drama I**

Dramas covering the 18th and first half of the 19th centuries. Lectures on dramatists and changes within the structure of dramas. Student research papers. Offered infrequently. Prereq: GERM 311 and 312.

GERM 422: 3 s.h.**German Drama II**

Dramas covering the second half of the 19th century and into the 20th century. Procedure similar to GERM 421. Offered infrequently. Prereq: GERM 311 and 312.

GERM 431: 3 s.h.**The Novelle in German Literature**

Lectures on the development and theory of the genre from its beginnings to about 1870. Reading and discussion of outstanding Novellen as examples of a theory and a literary era. Research papers and oral reports. Offered infrequently. Prereq: GERM 311 and 312.

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 infrequently. 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 in fall. Prereq: GERM 351 and GERM 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 school. 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 and EDFN 330. Offered in fall only. Prereq: admission to Advanced Professional Studies, GERM 470 or FREN 470 or SPAN 470.

GERM 490: 3 s.h.

See course description under FREN 490.

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 adviser and consent of instructor: (See the *Graduate Catalog* for course descriptions.) Undergraduate course number on left corresponds with graduate number in parentheses.

GERM 401 (501): 3 s.h.**Modern Methods of Teaching German****GERM 405 (505): 3 s.h.****Introduction to Literature****GERM 407 (507): 3 s.h.****Theater Workshop****GERM 409 (509): 3 s.h.****Applied Linguistics****GERM 416 (512): 3 s.h.****Introduction to Phonetics****GERM 417 (513): 3 s.h.****Advanced Phonetics****GERM 441 (521): 3 s.h.****Functional Grammar Review****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 445 (525): 3 s.h.****Advanced Oral Practice and Self-Expression****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 481 (581): 3 s.h.

Seminar in Medieval German Literature

GERM 482 (582): 3 s.h.

Seminar in the Literature of Humanism and the Reformation

GERM 483 (583): 3 s.h.

Seminar in the Literature of the Baroque Period

GERM 484 (584): 3 s.h.

Seminar in the Literature of the Classical Period

GERM 485 (585): 3 s.h.

Seminar in Nineteenth Century German Literature

GERM 486 (586): 3 s.h.

Seminar in Twentieth Century German Literature

GERM 491 (589): 3 s.h.

Current Topics

Ancient Greek

GREK 101: 3 s.h.

Elementary Greek I (G1)

Grammar and culture studied through readings based on Plato, Herodotus, Thucydides, et al. Preparation for reading classical and New Testament works. Intended for beginners. Offered infrequently.

GREK 102: 3 s.h.

Elementary Greek II (G1)

Continuation of the approach used in the first semester. Readings based on Aristophanes' Birds, Wasps and Lysistrata and Demosthenes' Prosecution of Neaira. Offered infrequently. Prereq: GREK 101.

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 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.

GREK 201: 3 s.h.

Intermediate Greek I (G1)

Review of elementary materials and progression into advanced forms and syntax. Readings in classical and koine Greek. Offered infrequently. Prereq: GREK 102.

GREK 202: 3 s.h.

Intermediate Greek II (G1, W)

Introduction to Greek literature through a variety of Greek authors, especially Homer's Odyssey, Herodotus and Euripides' Medea. Offered infrequently. Prereq: ENGL 110, GREK 201.

HUMN 202: 3 s.h.

Classical Mythology (G1, W)

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. Prereq: ENGL110.

HUMN 240: 3 s.h.

Greek Literature in Translation (G1)

The origins of Western culture from the perspective of Greek literature, illustrating the development of ideas from myth to rationalism. A cultural orientation for all degree programs. Course taught in English by an instructor of classical languages. Offered infrequently.

GREK 311: 3 s.h.

Survey of Literature I

Life and literature of prose writers in the area of history, oratory and philosophy. Offered infrequently. Prereq: GREK 202.

GREK 312: 3 s.h.**Survey of Literature II**

Continuation of GREK 311; introduces Greek poetry and metrics. Offered infrequently. Prereq: GREK 311.

GREK 498: 1-3 s.h.**Independent Study**

For further information on independent study, see the *Special Academic Opportunities* section.

NOTE: Major works of epic, tragedy, comedy, philosophy, oratory, history and lyric poetry constitute the advanced courses.

*Latin***LATN 101: 3 s.h****Elementary Latin I (G1)**

Introduction to language and culture of ancient Rome. Study of forms, syntax and idioms. Emphasis on analytical thinking and English vocabulary building. Intended for beginners. Offered in fall.

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 in spring. 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, W)**

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. Prereq: ENGL 110.

HUMN 250: 3 s.h.**Latin Literature in Translation (G1)**

Broad literary genres: comedy, epic, lyric and elegiac poetry, satire, oration, essay, letter and historical style, as molded by the Romans from their Greek prototypes. Cultural orientation for all degree programs. Course taught in English by an instructor of classical languages. Offered infrequently.

HUMN 302: 3 s.h.**Confession, Apology, Memoir: Autobiography in the Greco-Roman World (P)**

Investigates unique aspects of the Western intellectual tradition including literature of self-awareness and self-revelation in Classical Antiquity. Texts include autobiographies of politicians, writers, philosophers and religious leaders. Special attention to Late Antiquity and the interaction between paganism and Christianity. Main authors: Marcus Aurelius, Saint Augustine and Boethius. 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.

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.

LATN 310: 3 s.h.**Historical Writings I**

Livy (major author), also Cicero, Sallust, Caesar, Nepos. Roman history from the beginning to the end of the Republic seen through texts in the original language. Offered infrequently. Prereq: LATN 202 or equivalent.

LATN 320: 3 s.h.**Oratory**

Cicero (major author), also Quintilian. History of Greek and Roman rhetoric with concentration upon selected orations of Cicero. Offered infrequently. Prereq: LATN 202 or equivalent.

LATN 330: 3 s.h.**Epic Poetry**

Vergil (major author), also Ennius and Lucan. History of Greek and Roman epic with concentration upon Vergil's "Aeneid." Offered infrequently. Prereq: LATN 202 or equivalent.

LATN 340: 3 s.h.**Mythological Poetry**

Ovid (major author), also Vergil, Horace and Catullus. Origins and development of Greek and Roman mythology with emphasis on Ovid's "Metamorphoses." Offered infrequently. Prereq: LATN 202 or equivalent.

LATN 351: 3 s.h.**Latin Oral Expression and Composition**

Systematic practice of oral and listening skills. Basic techniques of writing connected prose. Study of complex syntactical structures of Latin classical style. Offered infrequently. Prereq: LATN 202 or equivalent.

NOTE: Instructor's approval is required for admission to Latin 400-level courses.

LATN 410: 3 s.h.**Historical Writings II**

Tacitus and Suetonius. Roman history from Augustus to Domitian with special attention given to the "Annals" of Tacitus and to Suetonius' Lives of the Caesars. Offered infrequently. Prereq: LATN 202.

LATN 420: 3 s.h.**Lyric Poetry**

Catullus and Horace. History of Greek and Roman lyric poetry with concentration upon the poems of Catullus and the "Odes" and "Epodes" of Horace. Extensive study of metrics is included. Offered infrequently. Prereq: LATN 202.

LATN 430: 3 s.h.**Drama**

Plautus, Terence (major authors), also Seneca. History of Greek and Roman drama with special emphasis upon the comedies of Plautus and Terence. Offered infrequently. Prereq: LATN 202.

LATN 440: 3 s.h.**Epistolary Literature**

Cicero, Pliny (major authors), also Seneca and Ovid. Selected letters extant from the Republic and Early Empire, including poetic letters of Ovid, are read in Latin with attention to style and Roman political and social history. Offered infrequently. Prereq: LATN 202.

LATN 450: 3 s.h.**Philosophical Literature**

Lucretius, Cicero (major authors), also Seneca. History of Greek and Roman philosophy with concentration upon Lucretius' poetic interpretation of Epicurus and Cicero's philosophical treatises. Metrical study is included. Offered infrequently. Prereq: LATN 202.

LATN 460: 3 s.h.**Satiric Literature**

Horace, Juvenal, Martial (major authors), also Seneca and Petronius. History of satire with emphasis upon the satires of Horace and Juvenal and the epigrams of Martial. Metrical study is included. Offered infrequently. Prereq: LATN 202.

LATN 498: 1-3 s.h.**Independent Study**

For further information on independent study, see the *Special Academic Opportunities* section.

Italian (Offered in cooperation with Franklin & Marshall College.)

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 infrequently.

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 h.s. Italian.

Japanese (Offered in cooperation with Franklin & Marshall College.)

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 infrequently.

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. Prereq: JAPN 101 or equivalent. Offered infrequently.

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 infrequently. 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 h.s. 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 adviser as a supplement to the department requirements. Evaluation is by written examinations. Offered infrequently. Prereq: ENGL 110.

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 world view 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.

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 h.s. Russian.

RUSS 202: 3 s.h.**Intermediate Russian II (G1)**

Continued development of the skills nurtured in 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 h.s. Russian.

*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 in 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 in fall, spring. Prereq: SPAN 101 or 2 yrs. of h.s. Spanish.

SPAN 201: 3 s.h.**Intermediate Spanish I (G1)**

Emphasis is placed on further developing the 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 in 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; structures and 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 in 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 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.

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.

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 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**

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 audio visual material to emphasize the differences among pre-Columbian countries. 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. Prerequisites: 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 in fall (351, 352) and spring (351).

SPAN 361 and 362: 3 s.h. each**Oral Spanish I and II**

Intensive experience with the spoken language. Taped 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 in spring. Prereq: SPAN 351 or equivalent.

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 interest 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 or 313.

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 or 313.

SPAN 413: 3 s.h.

Spanish Poetry III

A study of the representative works of 20th-century Spanish or Spanish American poets, such as Juan Ramón Jiménez, Gabriela Mistral, Federico García Lorca, César Vallejo, Pablo Neruda and others. Class discussions, lectures, outside readings and reports. Offered periodically. Prereq: any two of SPAN 311, 312 or 313.

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. Lecture, discussions, outside readings and reports. Offered periodically. Prereq: any two of SPAN 311, 312 or 313.

SPAN 422: 3 s.h.

Spanish Drama II

A study of the Spanish theater from 1700 through the 19th-century. Includes the neoclassic, romantic and realist dramatists such as Echegaray, Tamayo y Baus and Zomilla. Lecture, discussions, outside readings and reports. Offered periodically. Prereq: any two of SPAN 311, 312 or 313.

SPAN 423: 3 s.h.

Spanish Drama III

Reading of representative plays of 20th-century Spanish or Spanish American dramatists. Lecture, outside readings, discussions and reports. Offered periodically. Prereq: any two of SPAN 311, 312 or 313.

SPAN 428: 3 s.h.

Women in 19th-Century Peninsular Drama

An advanced Spanish literature course which examines the development of romantic and realist peninsular theatre and focuses specifically on the female protagonists of the genre. The course is given in Spanish: readings are in Spanish. Lectures, discussions, outside readings and reports. Offered periodically. Prereq: any two of SPAN 311, 312 or 313.

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. Lecture, discussion, outside readings and reports: Offered periodically. Prereq: any two of SPAN 311, 312 or 313.

SPAN 432: 3 s.h.

Spanish Prose II

Study of Spanish narrative forms from the 18th century to the present day. Lecture, discussions, outside readings and reports. Offered periodically. Prereq: any two of SPAN 311, 312 or 313.

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 or 313.

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 in 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 in 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 and EDFN 330. Offered in fall. Prereq: admission to advanced professional studies, SPAN 470 or FREN 470 or GERM 470.

SPAN 490: 3 s.h.

See course description under FREN 490.

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 adviser and consent of the director of the Spanish graduate program. (See the *Graduate Catalog* or course descriptions.) Undergraduate course number on left corresponds with graduate course number in parentheses.

SPAN 401 (501): 3 s.h.**Modern Methods of Teaching Spanish****SPAN 403 (503): 3 s.h.****Activities for Class and Club****SPAN 409 (509): 3 s.h.****Applied Linguistics****SPAN 416 (512): 3 s.h.****Introduction to Phonetics****SPAN 417 (513): 3 s.h.****Advanced Phonetics****SPAN 441 (521): 3 s.h.****Functional Grammar Review****SPAN 442 (522): 3 s.h.****Composition****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 452 (552): 3 s.h.****Spanish-American Geography****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 Latin America****SPAN 481 (581): 3 s.h.****Seminar in Medieval Spanish Literature****SPAN 482 (582): 3 s.h.****Seminar in Renaissance Literature****SPAN 483 (583): 3 s.h.****Seminar in Golden-Age Literature****SPAN 484 (584): 3 s.h.****Seminar in Eighteenth-Century Literature**

SPAN 485 (585): 3 s.h.
Seminar in Nineteenth-Century Literature

SPAN 486 (586): 3 s.h.
Seminar in Twentieth-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

School of Humanities and Social Sciences

Associate Professor Cuthbert, chairperson
Professor Shanahan
Associate Professors Geiger, Schreiber, Thompson
Assistant Professor Kelly

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, economics 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; three from GEOG 20x, 30x, 23x, 33x, 43x or GEOG 372; one from GEOG 22x; one from GEOG 24x, 34x, 44x; 300 or 488; 6 s.h. in geography electives. Required related courses: MATH 130 or 235; 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; 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 adviser, each student will select a concentration totalling 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.

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. Offered in fall, spring and summer.

GEOG 120: 3 s.h.

Human Geography (G3)

Cultural geography of race, ethnicity, gender and political systems. Emphasis on processes that create and maintain cultures and the geographies that these processes produce. Offered in fall.

GEOG 141: 3 s.h.

World Regional Geography (G3)

Examination and comparison of the 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. Offered in fall, spring.

GEOG 202: 3 s.h.

Resources and the Environment (G3)

Critical resources 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 in 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 infrequently.

GEOG 226: 3 s.h.

Political Geography (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 annually. 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. Offered annually.

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 Earth's physical environment including atmosphere, hydrosphere, lithosphere and biosphere. Viewing 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. Offered in fall, spring and summer.

GEOG 248: 3 s.h.

Geography of Africa (G3)

The course uses a thematic approach to examine many of the sub-fields of geography as they pertain to Africa. Topics include the physical landscape, climate, vegetation, environmental issues, pre-colonial and colonial history, politics, culture, population, urbanization, agricultural and economic development, and medical 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)**

Introduction to maps as the basic analytical tool of geographers. Map reading, measurement, interpretation and basic spatial data collection and analysis are examined in the contexts of general map use and of geographic research. Offered in fall, spring.

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 analytical 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 annually. 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**

An interdisciplinary study of how we plan, manage and use water in the United States. Topics range from water law to hydrology. Offered periodically. 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 any general education or perspectives course (3 s.h. or greater) in earth science, physics or chemistry.

GEOG 306: 3 s.h.**Environmental Impact Assessment**

Introduction to the various requirements and methods for developing federal environmental impact statements. Includes detailed application of technical methods for impact assessment of the air, water, biological and socioeconomic environments. Offered periodically. Prereq: GEOG 202 and 230 or permission of instructor.

GEOG 321: 3 s.h.**Human Settlement Patterns (P)**

The history, evolution, form and functions 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, ENGL 110, COMM 100 and junior status.

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 recreation experiences. Offered infrequently.

GEOG 333: 3 s.h.**Biogeography (G3)**

Interactions between environmental, biological and human processes 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 agriculture, 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 annually. Prereq: ENGL 110.

GEOG 343: 3 s.h.**Latin America (P)**

Study of contemporary economic, social and environmental issues. Topics like population growth, land use changes, industrialization, urbanization and regional ecological changes are discussed. Offered periodically. Prereq: COMM 100, ENGL 110; GEOG 101, 141, 120 and junior status.

GEOG 344: 3 s.h.**North America (G3)**

Introduction to geography of the U.S. and Canada using the tools and concepts of regional geography. Various physical, population and economic patterns are analyzed and regional social and environmental issues addressed. Offered in fall, spring and summer.

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 annually.

GEOG 384: 3 s.h.**Cartography**

Introduction to concepts and techniques of map making. Skill developed in computer-based compilation, layout, drawing 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 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 but related to environmental analysis.

GEOLOGY

See Earth Sciences

GERMAN

See Foreign Languages

GERONTOLOGY

Professor Gregoire, 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 and 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, GERT 210, NURS 350, PSYC 229, SOWK 306; 1 of the following courses: GERT 300/301, PHIL 280, SOCY 214. Other topics courses approved by the program coordinator.

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.

GERT 210: 3 s.h.

Aging and the Law (G3, W)

Introduction to legal concepts and thinking. Study of the laws, regulations, social policies and psychological factors that affect delivery of services to the elderly in area of economic security, employment, health care, wills, mental health, housing, criminal justice, consumer protection. Offered periodically. Prereq: ENGL 110.

GERT 300/301: 3 s.h.

Field Practicum

Supervised practicum at cooperating agencies and organizations active in serving elderly, for a minimum of 150 hours (10hrs/week). Involvement in meeting physiological and/or psychological and/or social needs of the elderly. Prereq: GERT 100 and at least 30 s.h. of general education and gerontology courses. Faculty involvement in and approval of practicum plan. Malpractice liability insurance required.

GOVERNMENT AND POLITICAL AFFAIRS

School of Humanities and Social Sciences

Professor Glenn, chairperson

Professors K. Bookmiller, Lee

Associate Professors R. Bookmiller, Greenawalt

Assistant Professors Bagchi, Lawrence

The Department of Government and Political Affairs offers a liberal arts major and minor. Departmental honors option is available to qualified majors, as are pre-law advising and internship opportunities.

COURSE REQUIREMENTS

Government and Political Affairs (B.A.): 120 s.h.

Complete both A and B:

A. 33 s.h. in government and political affairs, including 15 s.h. at the 300 level or above. Students must complete GOVT 111: Introduction to American Government, GOVT 221: Introduction to Comparative Political Systems, GOVT 231: Introduction to Political Theory, GOVT 251: Introduction to Global Affairs.

Students should check the course description portion of the catalog for prerequisites and recommended courses.

It is recommended that students planning graduate or other advanced study in government and political affairs complete GOVT 301: Political Research Skills and Methods.

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 in economics, geography and government and four in history. In consultation with an academic adviser, each student will select a concentration totalling 30 s.h. from along 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 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.

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 in fall, spring.

GOVT 111: 3 s.h.**Introduction to American Government (G3)**

Introduction to the major tenets of the American political system. Offered in 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 in 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 in fall, spring.

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 in 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 in 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 in 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 in 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 in fall, spring.

GOVT 301: 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 in fall.

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 in fall. Prereq: ENGL 110. Recommended: GOVT 111.

GOVT 314: 3 s.h.**The American Judiciary (G3)**

Examination of state and federal courts. Primary emphasis on federal courts and especially the U.S. Supreme Court. Offered in 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 policy making by Congress. State legislatures are also examined in the same manner. Offered in spring. Prereq: ENGL 110. Strongly recommended: GOVT 111.

GOVT 323: 3 s.h.**Government and Politics of the Middle East (G3,D)**

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 in 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 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 in 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 in 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. Examine public policy alternatives regarding land use and development patterns. Introduce methods and techniques used in designing settlement systems and study 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 in 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 in 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 in fall. Recommended: GOVT 111 or GOVT 251.

GOVT 361: 3 s.h.**The Politics of Race and Ethnicity (G3)**

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 in 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 I: 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 in fall. Prereq: GOVT 111, strongly recommended: GOVT 314.

GOVT 412: 3 s.h.**Constitutional Law II: 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 in spring. Prereq: GOVT 111, strongly recommended: GOVT 314.

GOVT 498: Variable credit**Independent Study**

For further information on independent study, see the *Special Academic Opportunities* section.

GRAPHIC COMMUNICATION TECHNOLOGY

See Industry & Technology

GRAPHIC DESIGN

See Art

GREEK

See Foreign Languages

HEALTH & PHYSICAL EDUCATION

See Wellness & Sport Sciences

HISTORY

School of Humanities and Social Sciences

Professor Bremer, chairperson

Professor Downey

Associate Professors Frankum, Kevorkian, McLarnon, Weis

Assistant Professors, 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. In addition, it offers applied history, which enables students to learn skills in historical editing, museum work and other related areas. 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 in economics, geography and government and four in history. In consultation with an academic adviser, each student will select a concentration totalling 30 s.h. from along 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. Students who concentrate in history are highly encouraged to take 15 s.h. in history. 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.

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 in 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 in fall, spring.

HIST 105: 3 s.h.

Introduction to the Craft of History

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 requirements. Offered in fall, spring.

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 in fall, spring.

HIST 206: 3 s.h.

The World to 1500 (G3)

Survey of world history from known beginnings to 1500. Offered in spring.

HIST 210: 3 s.h.**Women and Western Civilization (G3)**

History of women in Europe. Ideas about women, education, suffrage and feminist movements, economic and family roles. Offered periodically.

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 annually.

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 socio-economic 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 241: 3 s.h.**Imperial Russia**

Political, cultural, economic and social history from Peter the Great to the Russian Revolution. Offered annually.

HIST 242: 3 s.h.**Soviet Union (G3)**

Political, cultural, economic and social history from the Russian Revolution to the present. Offered in spring.

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 in fall of even years.

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 present. Offered annually.

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 a 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 a 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 periodically. Prereq: ENGL 110.

HIST 281: 3 s.h.**African History (G3, W)**

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 periodically. Prereq: ENGL 110.

HIST 284: 3 s.h.**Modern Latin America (G3, W)**

Continuation of HIST 283 from 1826 to the present. Offered periodically. Prereq: ENGL 110.

HIST 290: 3 s.h.**The Far East in Modern Times**

The cultural, political and socio-economic 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 present, with special emphasis on the period after 1850. Offered periodically. Prereq: ENGL 110.

HIST 308: 3 s.h.**Topics**

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 in fall of even years. Prereq: ENGL 110.

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 in spring of odd years. Prereq: ENGL 110.

HIST 334: 3 s.h.**Victorian England**

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.

HIST 340: 3 s.h.**Twentieth-Century Europe (G3, W)**

The political, socio-economic, cultural and diplomatic transformation of Europe, 1900 to the present. Offered in spring of odd years. 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 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 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 socio-political and economic institutions, as well as, the development and impact of such external factors as Islam, Christianity and the transatlantic slave trade. Offered annually. 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. Seminar will be offered in the fall semester with a United States history theme and in the spring semester with a world history theme. Limited to students who have completed at least 24 credit hours of history courses or by permission of the instructor. (Satisfies advanced writing [AW] requirement if a grade of B or higher attained.)

HIST 410: 3 s.h.**European Cultural and Intellectual History (G3)**

History of European philosophy, political and social thought, the arts and literature from the Enlightenment to the present. Offered in fall of even years.

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 transatlantic 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 U.S. (G3, W)**

The intellectual ideas and cultural trends that have helped shape American history. Offered in fall of odd years. 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 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 every other spring semester. 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 508

Readings in Regional History

HIST 510

Topics in United States History

HIST 511

Topics in European History

HIST 512

Topics in Regional History

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 either SSCI 201-H or 202-H, either ENGL 238-H or 239-H, an honors laboratory science course, an honors perspectives course, at least nine hours of honors electives and HNRS 489/499 (Honors Independent Study and Senior Thesis or departmental honors thesis equivalent). Students must pass honors courses with grades of B- or higher to receive honors credit for their work. A minimum of 30 credit hours of honors classes and a cumulative GPA of 3.35 is required to graduate in the Honors College.

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 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 in 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 hypothesis and collect appropriate information to test 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, neuro-transmission, 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 counts as one entry in the science

component of general education and results in 5 hours of general education credit. 1 hr. discussion. Coreq: concurrent registration in CHEM 112 is required. Prereq: CHEM 111 grade B- or higher and consent of Honors College Committee.

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 twentieth 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 in spring. Prereq: CHEM 102, 104, or 111; 2 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 in fall, spring

ESCI 202H: 4 s.h.

The Earth in Space (G2, L)

A quantitative 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 calculus, are supported by observation, experiment and theory. 3 hrs. lec., 2 hrs. lab. Offered periodically in spring. Prereq: MATH 161 or MATH 163 or MATH 155-156. Restricted to students in University Honors College, B.S. Ed. in Earth sciences, or who have at least a 3.35 GPA.

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 in fall, spring.

ENGL 238H: 3 s.h.

The Western Literary Tradition I (G1, W)

Works of the Western literary tradition from the Ancient World and through the Renaissance. Offered annually. Prereq: ENGL 110, member University Honors College or 3.35 GPA.

ENGL 239H 3 s.h.

The Western Literary Tradition II (G1, W)

Works of the Western literary tradition from the Neoclassical period to the present. Offered annually. Prereq: ENGL 110, member University Honors College or 3.35 GPA.

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 underlying philosophy of the mathematics and use of calculus in a modern computational environment. Offered in 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 in 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 counts as one entry in the science component of the curriculum record form and results in six hours of general education credit. Offered in 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 201H: 3 s.h.

The Western Intellectual Tradition I (G3, W)

Currents of thought in Western civilization from the ancient world through the Enlightenment, focusing on seminal thinkers and their impact on the culture of the West. Offered annually. Prereq: Member University Honors College or 3.35 GPA.

SSCI 202H: 3 s.h.

The Western Intellectual Tradition II (G3, W)

Currents of thought in Western civilization since the French Revolution, focusing on seminal thinkers and their impact on the culture of the West. Offered annually. Prereq: Member University Honors College or 3.35 GPA.

HUMANITIES

School of Humanities & 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.

INDUSTRY & TECHNOLOGY

School of Education

Professor David, chairperson
 Professor Litowitz, EDTE coordinator
 Associate Professor Wright, ITEC coordinator
 Professor Anna, OSEH coordinator
 Professors DeLucca, Gemmill, Johnson, McCade, Specht
 Associate Professors Bell, Brusic, Kerekgyarto
 Assistant Professors Atharifar, LaPorte, Painter, Snyder, Warner

The Department of Industry & Technology (I&T) offers nationally accredited programs of study leading to an A.T. or B.S. in Industrial Technology, a B.S. in Occupational Safety and Environmental Health, and a B.S. in Education in Technology Education. Minors are offered in Industrial Technology, and Occupational Safety and Environmental Health. Post-baccalaureate technology education teacher certification is also offered.

Students may participate in the activities of the Technology Education Collegiate Association, National Association of Industrial Technology, Society of Manufacturing Engineers, American Society of Safety Engineers, Human Powered Submarine Club 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 I & T 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.

Industrial Technology (ITEC), A.T., B.S.

The ITEC associate's 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 industrial technology or occupational safety and environmental health (OSEH). Technical options in the associate of technology program include computer-aided drafting and design (CADD), construction, electronics/control systems, graphic communications, manufacturing, mechanical technology, nanofabrication and occupational safety.

The bachelor of science degree program prepares technologists and technical managers with qualifications in general education, technological literacy, a technical option and management. Technical options are available in CADD, construction, electronics/control systems, graphic communications, manufacturing, mechanical, nanofabrication and general industrial technology. The National Association of Industrial Technology has accredited this program, except the new options of construction and nanofabrication.

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 that represent the technical options 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 ITEC minor complements majors in art, business administration, speech communication, computer science, economics, physics and OSEH. This minor enables specialization in several of the baccalaureate degree technical options.

Occupational Safety and 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, industrial technology, political science and nursing. OSEH is nationally accredited by the Accreditation Board of Engineering and Technology (ABET).

Technology Education (EDTE), B.S.Ed.

The EDTE 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.

EDTE majors are broadly prepared in general education, technology and professional teacher education. Emphasis is on understanding, applying, managing and assessing design, bio-related, 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 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 Education Association/Council on Technology Teacher Education.

COURSE REQUIREMENTS

Industrial Technology (ITEC) Major (A.T.): 61-65 s.h.

Technology Literacy courses (12 credits required): ITEC 110, 120, 130 and OSEH 120. Technical laboratory courses (21-22 credits required).

Technical Option (choose one):

- CADD (21 credits): ITEC 241, 243, 342, 346, 446 and two of ITEC 245, 300, 343, 344, 345, 445, 448 or related ITEC laboratory elective.
- Construction (21 credits): ITEC 241, 271, 331, 332, 336, 346 and one of ITEC 326, 375 or 376.
- Electronics/Control Systems (21 credits): ITEC 261, 262, 325, 364, 467 and two ITEC laboratory electives from the electronics specialization of ITEC 363, 465, 466 and related ITEC laboratory elective or control specialization of ITEC 326, 425, 427 and related ITEC laboratory elective.
- Graphic Communications (21 credits): ITEC 243, 251, 350, 356 and three of ITEC 300, 343, 355, 455, 456 or related laboratory elective.
- Manufacturing (21 credits): ITEC 241, 271, 281, 342, 382 and two of ITEC 300, 325, 336, 375, 376, 425, 445, 448, 483, 485.
- Mechanical Technology (21 credits): ITEC 241, 261, 271, 281, 325 and two of ITEC 300, 326, 336, 342, 382, 425, 445, 448.
- Nanofabrication Manufacturing (NFMT) (21 credits): ITEC 261, NFMT 311, 312, 313, 314, 315 and 316. The six NFMT courses comprise a capstone semester of hands-on experience for this associate's degree in state-of-the-art equipment and cleanroom laboratories in the Nanofabrication Facility at Penn State University in State College.
- Occupational Safety (22 credits): CHEM 104, OSEH 220, 221, 320, 321, 323 and a safety-related elective.

Additional requirements include:

Required Related Courses (16-17 credits): Science (7-8 credits): CHEM 103 or 205 except NFMT, PHYS 103 or 131; Math (3-4 credits): MATH 130 or 151 or 160; BAUD 251 and ENGL 312 or 316 except NFMT.

Industrial Technology (ITEC) Major (B.S.): 120 s.h.

Technology Literacy courses (9 credits required): ITEC 110, 120, 130. Technical laboratory courses (27 credits, except 30 credits for NFMT, required).

Technical Option (choose one):

- CADD (27 credits): ITEC 241, 243, 245, 342, 344, 346, 446 and two courses from one of the specializations: Product Design: ITEC 345, 445, 448 or Architectural Design: ITEC 343, 345.
- Construction (27 credits): ITEC 241, 271, 331, 332, 336, 346, 356, 433 and one related ITEC laboratory elective.
- Electronics/Control Systems (27 credits): ITEC 261, 262, 325, 364, 467 and the electronics specialization of ITEC 363, 465, 466 and one related ITEC laboratory elective or the control specialization of ITEC 326, 425, 427 and one related ITEC laboratory elective.
- General Industrial Technology (27 credits): ITEC 241, 251, 261, 271, 281, 325 and three ITEC laboratory electives at the 300 level or above, including one research and development (R&D) course.
- Graphic Communications (27 credits): ITEC 243, 251, 343, 350, 355, 356, 455, 456 and one related laboratory elective.
- Manufacturing (27 credits): ITEC 241, 271, 281, 382 and two of ITEC 375, 376, 483 and two of ITEC 325, 336, 425, 445, 448 and one of ITEC 476 or 485.
- Mechanical Technology (27 credits): ITEC 241, 261, 271, 281, 325, 326, 336, 342 or select one ITEC 445 or 448.
- Nanofabrication Manufacturing (30 credits): ITEC 241, 261, 262, NFMT 311, 312, 313, 314, 315, 316 and CHEM 302. The six NFMT courses comprise a full semester of hands-on experience in state-of-the-art equipment and cleanroom laboratories in the Nanofabrication Facility at Penn State University in State College.

Additional requirements include:

- Management Courses (24 credits required, except NFMT): Core (15 credits) OSEH 120, BUAD 251, 452, ITEC 492, 494 and Electives (9 credits) ITEC 300, 392, 400, 495, OSEH 221, 320, 323, 333, BUAD 161, 352 or 353. Construction requires the core plus OSEH 320 and 6 credits of the electives. NFMT requires 21 credits, including the core plus ITEC 400 or 498 and one of ITEC 392, OSEH 221, 320, 321, 323, 333, BUAD 161, 352 or 353.
- Required Related Courses (15-18 credits): Science (6-8 credits): CHEM 101, 103, 104, 205, PHYS 103, 131 or 132 [Note: NFMT option requires CHEM 104 or 111]; Mathematics (6-7 credits): MATH 130 and MATH 151, 160, 161 or 236; and ENGL 312 or 316.
- Recommended Perspectives Course: ITEC 301 or 302.

Industrial Technology Minor: 18 s.h.

Select one of the following Industrial Technology options:

- CADD: ITEC 241, 342 and four of ITEC 243, 343, 344, 345, 346, 445, 446 or 448.
- Construction: ITEC 130, 241, 271, 331, 332 and 433.
- Electronics/Control Systems: ITEC 120, 261, 262, 325, 364 and 467.
- General Industrial Technology: ITEC 110, 120, 130 and three additional ITEC laboratory courses (two required at 300 level or above).
- Graphic Communications: ITEC 110, 251 and four of ITEC 243, 343, 350, 355, 356, 455 or 456.
- Manufacturing: ITEC 130, 271, 281; two of ITEC 375, 376 or 382 and one of ITEC 476, 483 or 485.
- Mechanical Technology: ITEC 120, 130, 241, 261 and two of ITEC 325, 326, 336, 342, 425, 445, or 448.

Occupational Safety and 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 Education (EDTE) Major (B.S.Ed.): 126 s.h.**K-12 Teacher Certification**

Technology literacy courses (12 credits required): ITEC 110, 120, 130, 140. Technical courses (36 credits required): ITEC 241, 251, 261, 262, 271, 281, 325, 344, 346, 435 required and two advanced technical laboratory electives in communication, transportation/energy/power and/or production technology. Professional courses (27 credits required): EDTE 291, EDFN 211, EDFN 241 in the sophomore year; EDTE 391 in the junior year; and EDTE 461, EDTE 491, and EDTE 496 in the senior year. Students must be admitted to advanced professional studies (APS) with a 3.0 GPA or higher prior to entering EDTE 391 and then maintained through the completion of this teacher certification program.

Required Related Courses (15-16 credits): ENGL 312 or ENGL 316; BIOL 100, CHEM 103, CHEM 205 or PHYS 103; two general education MATH courses; and one general education ENGL literature course.

Recommended Perspectives Course: ITEC 301 or ITEC 302.

Post-baccalaureate Teacher Certification in EDTE

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.

COURSE DESCRIPTIONS*Industrial 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 sketching, drafting, 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, Power and Transportation Systems**

Principles of energy; electrical, fluid and mechanical power; and land, air, space and marine transportation. Includes propulsion methods and environmental concerns. 2 hrs. lec., 3 hrs. lab. Offered fall, spring.

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 135: 3 s.h.**Production Systems**

Student-centered analysis of goals, inputs, processes and outputs of manufacturing and construction systems. In-plant activities emphasized. Organizational structures and management strategies studied through the simulated organization and operation of a manufacturing and/or construction enterprise. 2 hrs. lec., 3 hrs. lab. Offered fall, spring. Prereq: ITEC 110, ITEC 120 (may be taken with) and ITEC 130.

ITEC 140: 3 s.h.**Bio-Related 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 bio-related technologies, issues, and impacts. 2 hrs. lec., 3 hrs. lab. Reserved for EDTE majors. Offered fall, spring.

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 and Design**

Freehand sketching, shading and basic elements of two-dimensional design. Includes elements and principles of design, methods of designing and evaluation and design of products and introduction to technical illustration. 2 hrs. lec., 3 hrs. lab. Offered fall.

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 post-press production. 2 hrs. lec., 3 hrs. lab. Offered fall, spring. Prereq: ITEC 110 or ART 244 or COMM 221 or by permission.

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 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 learners to better understand their own approach to technology. Learners will develop their own technology assessment system based on independent research. Offered in summer. Prereq: COMM 100, ENGL 110, and junior class standing.

ITEC 325: 3 s.h.**Power Conversion and Control**

Electric motors as conversion devices 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.

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.

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 331.

ITEC 336: 3 s.h.**Characteristics & Testing of Production Materials**

Examination of industrial materials, including fibrous, polymer, ceramic/glass, metallic, hydrosetting, composite and textile. Tests conducted on the application of adhesives, mechanical fasteners and cohesives comparing various strengths and weaknesses of each under controlled conditions. A research and development activity required. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 271 and 281.

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 343: 3 s.h.**Technical Illustration and Rendering**

Broad-based experiences in illustration and rendering techniques using a wide variety of mediums such as graphite pencil, colored pencils, pastels,

inks, watercolors, paints and dyes. Employs a variety of support materials: paper, illustration board, cloth and three-dimensional surfaces. Single and double action airbrushes are incorporated into various projects, along with layout, frisket and masking techniques. 2 hrs. lec., 3 hrs. lab. Offered spring. Prereq: ITEC 243 or permission of instructor.

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

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; and friction. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 241 or MATH 151 or higher 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 350: 3 s.h.

Still Photography

Black and white photography, including operation of a camera, lighting, developing film, making contact prints and enlargements and mounting prints for display. Emphasis on aesthetic and technical aspects. Student must supply 35 mm camera with light meter (single-lens reflex style with fully manual focusing and exposure capability preferred). 2 hrs. lec., 3 hrs. lab. Offered fall, spring.

ITEC 355: 3 s.h.

Contemporary Printing Technology

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 363: 3 s.h.

Analog Electronics

Theory and applications to develop concepts in the use of both discrete and integrated components. Includes transistors, diodes, thyristors, operational amplifiers, timers, phase-locked loops and voltage regulators. Amplifiers, oscillators and other applications featured. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 262 or permission of instructor.

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 off-line 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 written approval from 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.

Robotic Systems

Robotics and flexible automation. Includes the evaluation, justification, programming and integration of multiple control technologies to improve an industrial process. A research and development activity required. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 325 or permission of instructor.

ITEC 427: 3 s.h.**Designing Industrial Control Systems**

A synthesis of production systems, electricity and the basics of control systems. Students design, construct and troubleshoot a variety of industrial control systems utilizing programmable logic controllers, networks, control loops and off-line programs. A research and development component required. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 261 and 325.

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 445: 3 s.h.**Design for Manufacture and Assembly**

Methodologies and tools to define product development phases. Experiences with working in teams to design high-quality competitive products. Primary goals are to improve ability to reason about design, material and process alternatives and apply modeling techniques appropriate for different development phases. Topics covered are user requirements, including quality function deployment (QFD), design for assembly, design for manufacture and optimizing for cost and producibility. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 130 and ITEC 342 or permission of instructor.

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.**Color Separation and Reproduction**

Color theory, mechanical color separations, process color separations, color corrections, quality control methods and color reproduction. Experiences with computer separations, proofing, platemaking and printing. Includes a research and development component. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 251.

ITEC 456: 3 s.h.**Digital Imaging**

Digital images developed for printed and electronic publications and presentations. Emphasis on hardware and software technologies, their applications and interfaces. Hands-on activities require designing, composing and converting of printed and electronic images and establishing a digital workstation and electronic publishing site. 2 hrs. lec., 3 hrs. lab. Offered annually. Prereq: ITEC 356 or permission of instructor.

ITEC 465: 3 s.h.**Instrumentation and Control**

Utilization of electronics instrumentation and mechanical systems to make quantitative determinations and control functions for detecting the physical presence or activity of light, heat, fluids and force. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 262 or permission of instructor.

ITEC 466: 3 s.h.**Electronic Communication Systems**

Common communication and broadcast systems. Emphasis on AM/FM radio and monochrome television, including transmission, resonance, heterodyning action, detection and troubleshooting/problem solving procedures. A research and development activity required. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 262 or permission of instructor.

ITEC 467: 3 s.h.**Microprocessor Electronics**

Introduction of the microprocessor, microprocessor systems, programming and interfacing for practical applications. Covers a variety of microprocessors, including their structure, communication language and how the processor communicates with the system under its control. A research and development activity required. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 364 or permission of instructor.

ITEC 476: 3 s.h.**Wood Manufacturing Processes**

Experiences to develop proficiency in wood furniture production. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 271 or permission of instructor.

ITEC 483: 3 s.h.**Computer-Aided Manufacturing (CAM)**

Applies computer aided design (CAD) principles, part design specifications and producibility concepts to create part geometry, tool paths and machining parameters for high volume discrete part production. Design and hands-on experience enable advanced skills in employing automated machine tools. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 382 (486)

ITEC 485: 3 s.h.**Advanced Manufacturing Systems**

Computer integrated manufacturing (CIM) systems, strategies and implementation across the manufacturing enterprise. Focus on the integration of systems such as design of products, computer aided engineering (CAE), the control of quality, design and construction of production tooling, rapid prototyping, computer aided process planning (CAPP), finite element analysis (FEA), computer aided design (CAD), computer aided manufacturing (CAM), and computer numerical control (CNC). Manufacturing, automation and robotics emphasized. Advanced-level production experiences with an intensive research and development component required. 2 hrs. lec., 3 hrs. lab. Offered periodically. Prereq: ITEC 281.

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, ITEC and OSEH majors may enroll in the Department of Industry & Technology honors program. Contact the department office for guidelines and an application.

ITEC 492: 3 s.h.**Industrial Organization**

A student-centered exploration of industry and technology using the line-production and group-project methodologies. Students sample a variety of industrial personnel positions through role playing and simulation. 2 hrs. lec., 3 hrs. lab. Reserved for ITEC majors. Offered fall, spring. Prereq: ITEC 110, 120, 130.

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. Offered fall, spring.

ITEC 498: 1-3 s.h.**Independent Study in Industry & 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 Industry & 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 cleanroom 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.**Thin Films in Nanofabrication**

In-depth, hands-on exposure to depositing and etching a wide variety of materials, including dielectrics, semiconductors 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.**Advanced Lithography and Patterning Techniques**

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 nitradion, barrier materials, alloying, annealing and doping. Includes avoiding unintentional materials modification via the use of diffusion barriers, encapsu-

lation, 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 fire fighting 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: PHYS 132, OSEH 321 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 agencies 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 Education***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: EDTE 291, EDFN 211, EDFN 241 and ENGL 110. Admission to advanced professional studies (APS) required. Must achieve a "C" or higher to progress to student teaching.

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. Coreq: EDTE 461 Student Teaching.

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, ITEC 120, ITEC 130, ITEC 140, ITEC 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 adviser, 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 Industry and Technology****INTERNATIONAL STUDIES**

Associate 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 Major (B.A.): 120 s.h.

A. Major Field Requirements: 39 credits

1. Required courses (6 s.h.): INTL 201 and INTL 488.
2. Required core courses (12 s.h.): ANTH 121, ECON 203, GEOG 101, GOVT 251.
3. International Studies Electives (12 s.h.): Students choose two from the following four areas and take two courses from each area:
 - Comparative Societies
 - Economic Interdependence
 - Global Environmental Issues
 - International Relations
4. Area Studies Electives (9 s.h.): Students choose one of the following areas and take three courses from that area:
 - African Area Studies
 - American Area Studies
 - Asian Area Studies
 - European Area Studies

NOTE: Consult the Curriculum sheet or DARS for course listings in the elective and area studies and for distribution requirements.

B. Required Related Courses: 18 Foreign Language Credits

Students are required to minor in one approved foreign language offered by the Department of Foreign Languages. (If a student is eligible to use English to satisfy the foreign language component, the foreign language requirement is waived.)

Students desiring more in-depth study of particular topics may register for INTL 491: Topics in International Studies (1-6 s.h.) and INTL 498: Independent Study (1-6 s.h.). Students also may register for seminar, topics and contemporary issues courses from various departments that change from semester to semester. These latter courses, along with the topics and independent study credits may count under any of the major field categories with the approval of the director of international studies.

Majors are strongly encouraged to study abroad. Study abroad courses and international internship experiences may be counted toward the requirements of the major with the approval of the director of international studies.

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 in fall, spring.

INTL 488: 3 s.h.

Senior Seminar

Research, discussion and analysis of current global issues. Offered in 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.

LATINO STUDIES

Associate 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, economics, 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 three core courses: LATS 201: Introduction to Latino Studies, HUMN 380: Latino Issues of Identity and LATS 488: Senior Seminar. The seminar requires a senior project that will assure that the students develop research or practical experience, which can translate into career skills. The minor also requires six credits (two 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, economics, 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, HUMN 380 and LATS 488, plus two courses from two different departments 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 advisers.

COURSE DESCRIPTIONS

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 in fall. Prereq: COMM 100, ENGL 110 and junior status.

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 in fall.

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 annually.

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 adviser.

APPROVED LATINO STUDIES COURSES

Descriptions of these courses may be found under the appropriate departmental heading.

CORE COURSES

HUMN 380: Latino Issues of Identity

LATS 201: Introduction to Latino Studies

LATS 488: Latino Studies Senior Seminar

Race, Culture and Ethnicity (choose from two different departments)

ANTH 226: Comparative Societies (Latino Cultures)

ANTH 227: Culture through Film (Latino)

ANT 265: Hispanic Cultures in the U.S. (F&M)

ANTH 344: Gender, Race and Class

EDUC 403: Cultural Diversity: Pluralism in the Classroom

HIST 284: Modern Latin America

HIST 380: U.S.-Latin American Relations

SPAN 201: Intermediate Spanish I

SPAN 202: Intermediate Spanish II

SPAN 361: Oral Spanish I

SOCY 216: Human Population

Latino Electives (choose one)

ANTH 221: Peoples and Cultures of Mexico

ANT 263: Indians of Mexico (F&M)

ECON 203: Introduction to World Economics
ECON 226: Area Studies (with approval of LATS)
EDUC 433: Gender and Race Issues in Children's Literature
GEOG 343: Latin America
HI 231: Latin American Civilization – I (F&M)
HI 232: Latin American Civilization – II (F&M)
HIST 283: Colonial Latin America
HI 373: Modern Mexico (F&M)
HUMN 280: Latin American Women Writers
INTL 491: Topics in International Studies (with approval of LATS)
MATH 102: Survey of Mathematical Ideas in Non-European Culture
MUSI 263: Popular Music
PHIL 407: Political and Social Philosophy
PSYC 318: The Psychology of Racism
SPAN 211: Spanish for Business I
SPAN 212: Spanish for Business II
SPAN 301: Commercial Spanish
SPAN 313: Survey of Latin-American Literature
SPAN 362: Oral Spanish II
SPAN 433: Latin American Prose
SPAN 447: History of Spanish-American Civilization*
SPAN 452: Spanish-American Geography*
SPAN 461: History of Hispanic Art*
SPAN 472: Aspects of Contemporary Latin America*
SPAN 487: Seminar in Spanish-American Literature*
LATS 498: Independent Study

* Courses in the graduate program are open to undergraduates with consent of adviser and course instructor. These courses are usually taught only in the summer.

MANAGEMENT

See Business Administration

MANUFACTURING TECHNOLOGY

See Industry & Technology

MARINE BIOLOGY

See Biology

MARKETING

See Business Administration

MATHEMATICS

School of Science and Mathematics

Professor Smith, chairperson

Professor Schultz, assistant chairperson

Professors Buchanan, Catepillan, Fenwick, Shao, Shoemaker, Umble

Associate Professors Blum, Ikenaga, White, Zhan

Assistant Professors Cardwell, Heitmann, Miller, Robinson, Sell, Wismer

Instructor Brislin

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 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. in Education 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 MU for evaluation. University credit for freshman-level mathematics course(s) 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.

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 or PHIL 312 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 3 courses must include at least one of MATH 422, 435, 445, 465 or 467; others may be substituted by departmental permission.

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: BIO 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: 43-46 s.h.

1. Required core courses: MATH 161 or 163, 211, 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: 10-14 s.h.

1. CSCI 161.
2. Any two of the following courses: BIOL 375, ECON 235, 318, ESCI 241, 340, 341, 342, PHYS 231**, 232, CSCI 140*, 162, PHIL 312.

* Recommended ** Highly recommended

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 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, computers, 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 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.

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. MATH 100 and MATH 102 may not both be taken for general education credit. Offered in spring.

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 elementary education and special education 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 elementary education majors. Prereq: C or higher in MATH 104 and passing score on the basic skills test.

MATH 107: 1 s.h.**College Algebra Enrichment**

This course is designed for students taking MATH 101 College Algebra who, according to departmental placement criteria, need additional tutoring, practice and reinforcement in order to master the material of that course. Topics covered include linear equations and inequalities, word problems, polynomials and factoring, rational algebraic expressions, exponents and radicals, quadratic equations, rational equations, graphs of equations, systems of equations and logarithmic and exponential functions. Offered infrequently. Corequisite: MATH 101.

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 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 nor under block G2 for majors in the School of Science and Mathematics except for nursing majors. Prereq: any 100 level MATH course or MATH placement testing/evaluation before registration.

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 logarithm 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.

MATH 155/155H: 3 s.h.**Honors Applied Calculus I (G2)**

Provides non-science honors students with an introductory survey of calculus as applied to the business, social and life sciences with emphasis on limits and differentiation. Intended for students in the University Honors College. No credit for math requirement for any major in the School of Science and Mathematics. Offered infrequently. Prereq: MATH 160 or permission of instructor.

MATH 156/156H: 3 s.h.**Honors Applied Calculus II (G2)**

Optimization, integration, modeling. Frequent use of real applications demonstrates how calculus is used as a tool in the real world. No credit for math requirement for any major in the School of Science and Mathematics. Honors students in non-science majors are required to pass both MATH 155 and MATH 156 with grades of B- or higher in order to fulfill the honors calculus requirement. Offered infrequently. Prereq: MATH 155.

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: 2 years of high school algebra, 1 year of high school geometry and trigonometry; or MATH 101, 110 with a grade of C- or higher; math placement testing/evaluation before registration.

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.

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, 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 in fall. Prereq: permission of instructor.

MATH 171: 1 s.h.**Freshman Seminar in Mathematics**

This seminar, reserved for freshman mathematics majors with placement in MATH 161 (Calculus I) or higher, will introduce students to a mathematical way of thinking, through a sequence of exploratory problem assignments drawn from the areas of elementary calculus, probability, number theory, linear algebra, etc. Students will experience problem solving and mathematical research in a structured environment using discussion, collaboration, abstraction and technologies. Offered in fall. Coreq: MATH 161 or 163.

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 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 151 or 160. 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 in 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. Offered in fall, spring and periodically in summer. Prereq: COMM 100, ENGL 110, MATH 151 or 156 or 161 or 163 and junior status.

MATH 304: 3 s.h.**Mathematics for the Mentally & Physically Handicapped, K-12**

Specifically designed for the special education major; emphasizes the content, methods, strategies and materials for use in an effective educational program for LD, ED, EMR, TMR, SPMR and physically handicapped students. MATH 304 helps students become more competent and confident when working with mathematics in special education. Offered infrequently. Prereq: MATH 104 and completion of 60 s.h. For special education majors only.

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. Offered in fall, spring and periodically in summer. Prereq: ENGL 110 and 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 periodically. Co-req: 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 1. Does not count as an upper division elective for the mathematics major or minor. Offered in spring. Prereq: 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. Offered in fall, spring and periodically in summer. Prereq (or co-req.): 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. No credit for both MATH 333 and MATH 235 or for both MATH 333 and MATH 335. Offered in fall, spring and periodically in summer. Prereq: 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 in fall. Prereq: MATH 311.

MATH 345: 3 s.h.**Abstract Algebra I**

Groups, rings, fields, integral domains. Emphasis on structure of algebra. Offered in fall, spring and periodically in summer. Prereq: MATH 310 and 322.

MATH 353: 3 s.h.**Survey of Geometry**

Various examples of axiom systems, brief exposition of Euclidean geometry using Hilbert's axioms. Growth and development of geometry, non-Euclidean geometries and projective geometry. Elementary projective geometry from both the synthetic and analytic points of view. Offered in fall. Prereq: 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 in spring and periodically in summer. Prereq: 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 in fall, spring. Prereq: 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: MATH 322 and one of MATH 235, 333 or 335.

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. Offered in fall. Prereq: 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: 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: 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. Offered in fall, spring. Prereq: MATH 333 (or 335/435), 345 and MATH 353 or 355.

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 R^3 . Least squares approximation and theory of generalized inverses. Bilinear and quadratic forms and their matrix representations; applications to conic sections in R^2 and quadric surfaces in R^3 . Complex vector spaces. Offered periodically. Prereq: 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 in spring. Prereq: 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: 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: 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. Offered in fall, spring and periodically in summer. Prereq: MATH 310, 311, 322. MATH 345 recommended.

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 R^n ; differential calculus of functions $R^n \rightarrow R$ and $R^n \rightarrow R^m$; extreme values; implicit and inverse function theorems; Riemann integration in R^n ; metric spaces; function spaces; Riemann-Stieltjes integration. Offered infrequently. Prereq: 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 in spring. Prereq: 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: 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: 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: 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

Honors Courses

See course descriptions as listed within this department. Also see *Honors* section of this catalog. MATH/HNRS 163, MATH/HNRS 155, MATH/HNRS 156, 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 520: 3 s.h.

Logic and the Foundations of Mathematics

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

MECHANICAL TECHNOLOGY

See Industry & Technology

MEDICAL TECHNOLOGY

See Biology

MEDICINE

See Biology and Chemistry

METEOROLOGY

See Earth Sciences and Physics

MOLECULAR BIOLOGY

See Biology

MUSIC

School of Humanities and Social Sciences

Professor Houlahan, chairperson

Professor Renfro

Associate Professors Heslink, Tacka, Wiley

Assistant Professors Ardrey, Banks, Blundell, Corley, Darmiento, Gemmell

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.

A second degree program in music is in liberal arts (B.A.) in music and (B.A.) with music business and technologies and has been accredited by the National Association of Schools of Music.

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 providing a fuller intellectual grasp of the art.

The B.A. with emphasis in music business and technologies 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, University-Community Orchestra, Symphonic Band and Wind Ensemble, the Marauder Marching Unit, Chorale, Men's Chorus, Women's Choir, as well as, Chamber (String) Ensemble, 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

60.5 s.h. in music: MUSI 112, 131, 141, 151, 152, 153, 156, 162, 171, 212, 231 or 377, 251, 271, 312, 331, 362, 372, 373, 381, 412, 462, 481; five music electives; seven semesters of major performance and 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.

64 s.h. in music: MUSI 104, 112, 212, 131, 162, 191, 192, 231 or 377, 312, 315, 331, 362, 381, 411, 412, 462; eight semesters of major performance and applied musicianship courses. 6 credits music electives, 6 credits same foreign language, BUAD 101, PHYS 205, EDFN 130 and 6 credits general electives.

Music Major (B.A.): 120 s.h.

Music Business and Technologies

57.5 s.h. in music: MUSI 112, 131, 162, 191, 192, 204, 212, 231 or 377, 315, 331, 381, 411; 6 semesters of major performance and applied musicianship courses, 10 s.h. of music electives and one semester private guitar instruction. Courses in related areas include PHYS 205, ECON 102, BUAD 101, 161, 231, 251, CSCI 101 or 242, ENGL 316, one computer science course and 9 s.h. of internship.

Music Minor: 18 s.h.

MUSI 100, 103 or 104; 6 semesters of applied musicianship courses (audition required), 9 s.h. 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 in fall, spring.

MUSI 103: 3 s.h.

The Language of Music I (G1)

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 in 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 in 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 in fall, spring.

MUSI 112: 3 s.h.**Solfege, Harmony and Analysis I**

Provides an introduction to the structures and aesthetics of common-practice harmony for music majors and minors. Review of elements of pitch, 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 in spring. Prereq: MUSI 162.

Note Regarding Credit for Applied Musicianship Courses for Non-Music Majors

A block of any six applied musicianship courses (total of 3.0 credits) count as one general education (G1) course.

MUSI 120A, 121A, 220A, 221A, 320A, 321A, 420A, 421A: .5 s.h.**Applied Musicianship in Wind Ensemble**

Music literature, ensemble technique and performance practice through musical performance in wind ensemble. Offered in fall, spring.

MUSI 120B, 121B, 220B, 221B, 320B, 321B, 420B, 421B: .5 s.h.**Applied Musicianship in Concert Band**

Music literature, ensemble technique and performance practice through musical performance in concert band. Offered in fall, spring.

MUSI 122A, 123A, 222A, 223A, 322A, 323A, 422A, 423A: .5 s.h.**Applied Musicianship in Chamber Ensemble**

Music literature, ensemble technique and performance practice through musical performance in chamber ensemble. Offered in fall, spring.

MUSI 122B, 123B, 222B, 223B, 322B, 323B, 422B, 423B: .5 s.h.**Applied Musicianship in Orchestra**

Music literature, ensemble technique and performance practice through musical performance in orchestra. Offered in fall, spring.

MUSI 124A, 125A, 224A, 225A, 324A, 325A, 424A, 425A: .5 s.h.**Applied Musicianship in Jazz Ensemble**

Music literature, ensemble technique and performance practice through musical performance in jazz ensemble. Offered in fall, spring.

MUSI 124B, 125B, 224B, 225B, 324B, 325B, 424B, 425B: .5 s.h.**Applied Musicianship in Jazz Lab Band**

Music literature, ensemble technique and performance practice through musical performance in jazz lab band. Offered in fall, spring.

MUSI 126A, 127A, 226A, 227A, 326A, 327A, 426A, 427A: .5 s.h.**Applied Musicianship in Choir**

Music literature, ensemble technique and performance practice through musical performance in choir. Offered in fall, spring.

MUSI 126B, 127B, 226B, 227B, 326B, 327B, 426B, 427B: .5 s.h.**Applied Musicianship in Chorale**

Music literature, ensemble technique and performance practice through musical performance in chorale. Offered in fall, spring.

MUSI 126C, 127C, 226C, 227C, 326C, 327C, 426C, 427C: .5 s.h.**Applied Musicianship in Women's Choir**

Music literature, ensemble technique and performance practice through musical performance in women's choir. Offered in fall, spring.

MUSI 128, 228, 328, 428: .5 s.h.**Applied Musicianship in Marching Band Workshop**

The study of music literature, ensemble technique and performance practice through musical performance in marching band. Offered in fall.

MUSI 129, 229, 329, 429: .5 s.h.**Applied Musicianship in Marching Band**

The study of music literature, ensemble technique and performance practice through musical performance in marching band. Offered in fall.

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 in spring.

MUSI 134, 135, 234, 235, 334, 335, 434, 435: 1-2 s.h.**Major Performance (Piano)**

Includes private study and participation in masterclasses. Music majors and minors only. Offered in 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. Music majors only. Offered in 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 health care 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 in the summer.

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. Offered in 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. Music majors and minors only. Offered in 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 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 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 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 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. Music majors and minors only. Offered in 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 in fall.

MUSI 171: 1 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 in fall. Prereq: MUSI 112 and MUSI 131.

MUSI 191: 3 s.h.**Music Business for the Pop Musician**

Provides future music business professionals with a comprehensive overview of the music industry, as well as live, hands-on experience. Offered annually. Prereq: BUAD 101.

MUSI 192: 3 s.h.**Music Business for the Classical Musician**

Provides future music business professionals with a comprehensive overview of the field of arts administration, as well as live, hands-on experience. Offered annually. Prereq: BUAD 101.

MUSI 204: 3 s.h.**Electronic Music (G1)**

Explores electronic music as a major cultural expression in the 20th century through cultural trends, listening, analysis and theoretical study. Creative projects are integral to the course. Offered periodically.

MUSI 212: 3 s.h.**Solfege, Harmony and Analysis II**

Provides an 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 in fall. Prereq: MUSI 131.

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 in fall. Prereq: MUSI 112. Note: music students majoring in piano take MUSI 377 instead of this course.

MUSI 263: 3 s.h.**Popular Music (G1)**

Musical derivatives and development of pop, jazz and rock styles. Lecture, live and recorded musical demonstration, discussion and analysis. Offered in 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 in fall, spring. Prereq: MUSI 100 or 162.

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 in fall, spring. Prereq: MUSI 100 or permission.

MUSI 271: 3 s.h.**Elementary Methods (K-5)**

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, moving, 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 in spring. Prereq: MUSI 212, 141, 171 or permission.

MUSI 312: 3 s.h.**Solfege, Harmony and Analysis III**

This course provides in-depth coverage of the structures 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 in spring. Prereq: MUSI 331.

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 in spring. Prereq: MUSI 212.

MUSI 347: 2 s.h.**Choral Methods**

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 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 in spring.

MUSI 362: 3 s.h.**Music History and Literature I (W)**

Study of Western music in its cultural historical and philosophical contexts from 500 BC to 1750 AD, including its relationship to other art forms. Introduction to research in music history. Writing projects about music. Offered in fall. Prereq: ENGL 110, MUSI 100 or 162 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 in spring. Prereq: MUSI 100 or 103, COMM 100, ENGL 110 and junior status. Music majors should consult with the department for course requirements.

MUSI 368: 3 s.h.**World Music (P)**

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 in spring. Prereq: COMM 100, ENGL 110 and junior status.

MUSI 369: 3 s.h.**Introduction to West African Music (P)**

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.**Middle and Secondary School Methods**

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 in fall. Prereq: MUSI 162, 171, 271, 312, 331 or permission.

MUSI 373: 3 s.h.**Instrumental Methods**

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 in spring. Prereq: MUSI 152, 153, 156, 171, 381 or permission.

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 in fall every two years. Prereq: MUSI 331 or permission. 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 in spring. Prereq: MUSI 212, 281 or permission of instructor.

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 in spring. Prereq: MUSI 212 or permission.

MUSI 412: 3 s.h.**Solfège, Harmony and Analysis IV**

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 in fall. Prereq: MUSI 331.

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 University supervisor. Offered in 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 in fall, every two years. Prereq: MUSI 151, 251 or permission.

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. workshop/labs per week. Offered in fall. Prereq: MUSI 381 or permission.

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 every other spring semester. Prereq: COMM 100, ENGL 110 and junior status.

**MUSI 498: 1-3 s.h.
Independent Study**

For further information on independent study, see the Special Academic Opportunities section of the University Catalog. Offered fall, spring.

**MUSI 587: 3 s.h.
Music in the Kindergarten and Preschool Classroom**
Offered periodically in summer.**NANOFABRICATION MANUFACTURING TECHNOLOGY**

See Industry & Technology

NANOTECHNOLOGY

See Chemistry & Physics

NUCLEAR MEDICINE TECHNOLOGY

See Biology

NURSING

School of Science and Mathematics

Professor Zimmerman, chairperson
Professor Davis, Palmer
Associate Professors, Castellucci
Instructor Kuhns

The Department of Nursing offers an NLNAC-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, 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 health care 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, 322, 325, 423, 424, 426, 428, 438; 3 s.h. of nursing electives, 11 s.h. of biology, 3 s.h. of statistics, 3 s.h. of departmentally related courses, 28 s.h. lower division nursing credits on admission.

School Nurse Certification (K-12)

Approved Pennsylvania Department of Education School Nurse Certification Program is a post baccalaureate certification program. A BSN and PA registered nurse license are required. In addition, undergraduate evidence of: NURS 322, NURS 423, BIOL 256, EDFN 241, PSYC 227/228, MATH 130, MATH (3 s.h.), ENGL 110, ENGL (3 s.h.) literature and GPA of 3.0 upon BSN graduation. Applicants desiring admission should request information from the MU Certification Office. Graduate evidence of GRE results (optional); PSYC 505, PSYC 525, EDFN 545, NURS 560, PRAXIS I and II and GPA 3.0 upon completion of certification requirements.

COURSE DESCRIPTIONS

Junior Level (60-90 credits)

NURS 315: 3 s.h.**Scientific Advances in Health Care: 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 BSN majors.

NURS 316: 3 s.h.**Women, Health and Health Care: Controversies and Dilemmas (P)**

Examines the physical, psychosocial, economic, cultural, ethnic, racial and political factors that impact on women's health. Case studies of current health dilemmas that affect women in today's society will be analyzed. Offered fall, spring. Prereq: ENGL 110, COMM 100, and junior status. Does not satisfy nursing electives for BSN majors.

NURS 320: 3 s.h.**Conceptual Basis of Professional Nursing Practice**

Nursing theories, change and systems theories with application to health care delivery. Emphasis on decision making and the nurse as change agent. 3 hrs. lec. Offered in fall, spring. Nursing majors only.

NURS 322: 4 s.h.**Nursing Assessment of the Well Adult**

The assessment process of the holistic adult client utilizing physical assessment skills such as the techniques of inspection, palpation, percussion and auscultation are presented and practiced. Appropriate screening tests will be presented. 3 hrs. lec., 2 hrs. lab. Offered in fall and summer. Prereq: BIOL 254, 255 and 161.

NURS 324: 3 s.h.**Concepts in Pathophysiology**

Discusses pathophysiological mechanisms that serve to alter homeodynamics in the holistic person. Nursing measures and treatment modalities designed to enhance successful adaptation are correlated with specific disease status. 3 hrs. lec. Nursing elective. Offered periodically. Prereq: BIOL 161. Nursing majors only.

NURS 325: 3 s.h.**Adaptation Within the Wellness-Illness Continuum**

Focus on promotion of effective individual and family adaptation to stressors in the achievement of optimal wellness. Family, stress, nursing, crisis and systems theories as they relate to the holistic person's adaptation throughout the life cycle to continuous stressors in the environment. 3 hrs. lec. Offered spring only. Nursing majors only.

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. Offered in spring. Nursing majors only.

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 online. Open to all majors.

NURS 360: 3 s.h.**Transcultural Nursing Care (D)**

Provides an opportunity for examination of the major concepts related to transcultural nursing and allows learners to critically analyze current therapeutic nursing interventions as well as their communications with clients belonging to various ethnic groups in nursing practice situations. 3 hrs. lec. Nursing elective. Offered fall. Nursing majors only.

Senior Level (91-120 credits)

NURS 423: 5 s.h.**Dimensions of Community Health Nursing**

History and philosophy of community health nursing are explored. Role of preventive and promotive health teaching for individuals, families and the community is emphasized. Application of nursing practice and public health sciences occurs in community agencies. 3 hrs. lec., 4 hrs. lab. Offered in fall. Prereq: NURS 320, 322.

NURS 424: 5 s.h.**Health Promotion and Rehabilitation Nursing**

The nurse's role in promoting healthful adaptation of clients across the life span with chronic health problems is explored. The impact of chronic illness and disability on the individual and the family is addressed. The need for an interdisciplinary approach and utilization of the nursing process in providing rehabilitative care is stressed. Clinical experiences afford the student an opportunity to use critical thinking and creativity when providing care to clients and families faced with chronic health problems and disability in rehabilitation hospitals, therapy settings and community agencies. 3 hrs. lec., 4 hrs. lab. Offered in spring. Prereq: NURS 320, 322. Coreq NURS 325.

NURS 426: 4 s.h.**Nursing Leadership and Management (W)**

Discussion of current leadership, management and organizational theories and concepts and their usefulness in studying various problems in nursing. Emphasis is placed on integration of the problem-solving process and the nurse's role in decision making and evaluation. 3 hrs. lec., 2 hrs. lab. Offered in summer. Prereq: ENGL 110 and NURS 320.

NURS 428: 3 s.h.**Nursing Research**

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: 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.**Issues in Nursing**

Discussion of the political, economic, legal, ethical and related societal issues that influence nursing practice and education. Professional nursing roles and responsibilities are emphasized. 3 hrs. lec. Offered in summer. Nursing majors only.

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 investigate further an area of interest in practice, research or education in nursing. Offered periodically. Prereq: NURS 423, 428.

GRADUATE LEVEL COURSES

Several 500 level nursing courses are open to qualified undergraduates with permission from the instructor. For course descriptions, please refer to the *Graduate Catalog*.

NURS 501: 3 s.h.**Theoretical Foundation of Advanced Practice****NURS 503: 3 s.h.****Issues and Roles in Advanced Nursing Practice****NURS 511: 3 s.h.****Pathophysiology for Advanced Practice****NURS 514: 2 s.h.****Family Health Nursing****NURS 530: 3 s.h.****Vulnerable Populations****NURS 560: 5 s.h.****School Nursing****OCCUPATIONAL SAFETY AND ENVIRONMENTAL HEALTH**

See Industry & Technology

OCEAN SCIENCES AND COASTAL STUDIES

See Earth Sciences

OPTOMETRY

See Biology

PHILOSOPHY

School of Humanities and Social Sciences

Professor Smith, chairperson

Associate Professors Stameshkin, Ward

Assistant Professor 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 Thanatopsis: Viewing Death 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, 371; 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.

30 credits of philosophy and the required related courses as listed above for the major. PSYC 454 may be credited as an elective in philosophy.

30 credits of psychology and the required related courses as listed under the psychology major. PHIL 201 may be credited as an elective in psychology.

Philosophy Minor

PHIL 321, 322; either 211 or 312; either 328 or 371; 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, W)**

Intensive study of selected problems, figures or movements in psychology with emphasis on the philosophical foundations or implications. May be taken any number of times for credit. Offered infrequently. Prereq: ENGL 110.

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; use and misuse of language in reasoning; introduction to legal logic.

PHIL 280: 3 s.h.**Philosophies of Death and Dying (G1)**

Various ways people have confronted death and have sought to understand it. Offered periodically.

PHIL 285: 3 s.h.**Moral Problems in Medicine (G1)**

A study of biomedical moral and ethical problems. Offered annually.

PHIL 311: 3 s.h.**Computer Logic (G1)**

Introduces digital logics including a detailed study of logic gates and switching circuits. Offered infrequently. Prereq: computer science or science major or PHIL 211.

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, W)**

A study of the contents of certain living world religions. Offered infrequently. Prereq: ENGL 110.

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 in fall. Prereq: ENGL 110.

PHIL 322: 3 s.h.**Modern Philosophy (G1, W)**

Descartes, Leibniz, Spinoza, Locke, Berkeley, Hume and Kant. Offered in 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. Offered annually.

PHIL 328: 3 s.h.**Philosophical Classics (G1, W)**

One or more major works or of a major philosopher or philosophers. May be taken any number of times for credit. Offered periodically. Prereq: ENGL 110.

PHIL 331: 3 s.h.**American Philosophy (G1, W)**

A study of philosophy in America. Offered infrequently. Prereq: ENGL 110.

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 infrequently. 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 will be 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, W)**

A study of the European philosophical traditions of hermeneutics, phenomenology, existentialism and structuralism in their historical context, their relations to contemporary culture, particularly to psychology, literature, theology and political action. Offered infrequently. Prereq: ENGL 110.

PHIL 361: 3 s.h.**Asian Philosophy (G1, W)**

A study of significant ideas in the philosophical thought of Asia. Offered infrequently. Prereq: ENGL 110.

PHIL 371: 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 periodically. Prereq: ENGL 110 and 3 credits in PHIL at the 200-level or higher (excluding PHIL 211 & 312)

PHIL 373: 3 s.h.**Metaphysics (G1, W)**

Description and criticism of various metaphysical theories of reality. Offered infrequently. Prereq: ENGL 110.

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 infrequently. Prereq: ENGL 110.

PHIL 382: 3 s.h.**Philosophy of Religion (G1, W)**

An examination of the justifiability of religion and of the nature of the religious experience, especially religious language. Offered infrequently. Prereq: ENGL 110.

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 annually. 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: ENGL 110, junior status and two courses in one area of the social sciences or two courses in philosophy. Offered annually. Prereq: COMM 100, ENGL 110 and junior status.

PHIL 407: 3 s.h.**Political and Social Philosophy (G1, W)**

An examination of political and social philosophies with a view to discovering their relation to present political and social realities. Offered infrequently. Prereq: ENGL 110.

PHIL 498: Variable credit**Independent Study**

For further information on independent study, see the *Special Academic Opportunities* section

PHYSICS

School of Science and Mathematics

Professor Nolan, chairperson

Professors Dooley, Uy

Assistant Professors Dixon, Dushkina, Gilani, Goksu, Hendrick

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 provides as well a solid foundation for entrance into a graduate program in physics.

The physics-3/2 cooperative engineering option 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 one of the cooperating institutions: Pennsylvania State University or the University of Southern California. 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, we have two 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. 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.

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.

A minor program is also available for students who do not elect a major in physics. The minor offers students an exposure to physics through the intermediate level of our major program.

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

33 s.h. in physics: PHYS 198, 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 adviser. 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

49 s.h. in physics: PHYS 198, 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, 365; plus an additional 6 credits in mathematics at or above the 200 level.

Physics Major (B.A.): 120 s.h. minimum

Computer Science Option

30 s.h. in physics: PHYS 198, 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

33 s.h. in physics: PHYS 198, 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, 261, 340, 342, 343, 441, 442. Foreign language competency required through elementary level. Students presenting two years of successful high school study in one language satisfy this requirement.

*The ESCI courses fulfill the requirements for a minor in meteorology. Substitution of ESCI 343 for ESCI 245 will be accepted by the Earth sciences department. The courses fulfill the minimum course requirements for employment by the National Weather Service.

Physics Major (B.A.): 120 s.h. minimum

Nanotechnology Option

36 s.h. in physics: PHYS 198, 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**

36 s.h. in physics: PHYS 198, 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**

33 s.h. in physics: PHYS 198, 231, 232, 233, 266, 311, 321, 334, 335, 351, 492, 498. 20 s.h. in chemistry: CHEM 111, 112, 231, 232, 381. 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-3/2 Cooperative Engineering Option**

33 s.h. in physics at MU: 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 advisers or the physics department coordinator for cooperative engineering.

Physics Major (B.S.Ed.): 125 s.h.**Secondary Education Certification**

37-38 s.h. in physics: PHYS 198, 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.

COURSE DESCRIPTIONS**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 School of Science and Mathematics. Offered in fall, periodically in spring.

PHYS 104: 4 s.h. (G2, L)**Applied Physics**

A study of 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. Offered in 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 School of Science and Mathematics. Offered in 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. Competence in algebra and trigonometry is assumed. Offered fall, summer.

PHYS 132: 4 s.h.**Physics II with Algebra (G2, L)**

Continuation of Physics 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.

PHYS 198: 1 s.h.**Seminar: Perspectives in Physics**

An overview of the history, practice, philosophy and unity of physics and its application to other disciplines orienting beginning physics majors to the study of physics. Mandatory for, and only open to, physics majors in their freshman year. 1 hr. discussion. Offered in fall.

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 in 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 counts as one entry in the science component of the curriculum record form and results in six hours of general education credit. 1 hr. discussion. Offered in 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. lecture, 1 hr. recitation, one 3 hr. lab. Offered in fall, spring, summer. Prereq: 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 in fall, spring, summer. Prereq: 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 in spring. Prereq: 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 in 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 3 dimensions, conservation laws, linear and nonlinear oscillating systems, gravitation and central force problems. 3 hrs. lec. Offered in fall. Prereq: 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 in 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 in 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 in 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 in 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 hr. lab. Offered in 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 in spring. Prereq: PHYS 232. Coreq: MATH 311.

PHYS 335: 3 s.h.**Multi-Particle 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 in 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 in 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 in fall. Prereq: PHYS 233 and PHYS 266 or CSCI 370.

PHYS 352: 1 s.h.

Intermediate Physics Laboratory II

Continuation of PHYS 351. 3 hrs. lab. Offered in 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: 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.

Micro-Electronic 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 in 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 in 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 in 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 in fall. Prereq: PHYS 352.

PHYS 452: 1 s.h.

Advanced Physics Laboratory II

Continuation of PHYS 451. 3 hrs. lab. Offered in 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 in spring. Prereq: 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 in 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. 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 in 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 and Political Affairs.

PRE-MEDICINE

See Biology and Chemistry

PRE-OPTOMETRY

See Biology

PRE-PODIATRY

See Biology

PSYCHOLOGY

School of Education

Professor Tuleya-Payne, chairperson

Associate Professor Haferkamp, assistant chairperson

Professors Kelly, Luek, Hill, Smith-Wade-El, Woo

Associate Professors Benns-Suter, Foster-Clark, Gallagher, Garner, Szollos, Thyrum, Vrendenburg

Assistant Professors Baker, Cook, Lopez, Rudy, Rush

The Department of Psychology offers a B.A. degree in psychology, double majors with sociology, philosophy, special education, 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.

The undergraduate psychology courses are open to liberal arts and teacher education students. However, a few laboratory and specialized 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 GPA 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.

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 GPA below 2.0 or if any student with 30 to 59.5 earned credits has a GPA 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 what the student must achieve that semester to be continued 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.

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; PSYC 228; and PSYC 229. Credit is awarded for any of the individual courses. Credit is also awarded for the combination of PSYC 227 and PSYC 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 adviser, the directed projects instructor and the department of psychology's cooperative education adviser, 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.) are: PSYC 100, 211, 212; one of PSYC 314, 315, 316; an additional four courses (12 s.h. minimum) of psychology core electives (PSYC 227, 228, 229, 314, 315, 316, 317, 329, 335, 356, 415, 417, 437, 454) and 6 s.h. of psychology general electives (PSYC 234, 256, 311, 318, 319, 328, 346, 350, 403, 447, 455, 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, MATH 100 or any advanced mathematics course or a computer science course (none of the following satisfies this requirement: MATH 090, 104, 105, 110, 313, 304, 405); 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, 328, 335, 346, 356, 403, 417, 437 and 447. Recommended related courses are: BIOL 256; SPED 212; SOCY 210, 214, 216, 316, 317.

Business and Industrial: Select courses from among the following psychology electives: PSYC 234, 256, 311, 317, 318, 319, 329, 335 and 346. Recommended related courses are: CSCI 101; BUAD 101, 201, 202; ECON 100, 101, 102.

Preparation for Graduate Study: In addition to the required psychology courses, all of the following are strongly recommended: PSYC 314, 315, 316, 317, 335, 415, 417, 437 and 454.

Psychology-Sociology Double Major (B.A.): 120 s.h.

Psychology requirements: 33 credits of psychology and the required related courses as listed above for the major. Two courses from SOCY 210 (Sociology of the Family), SOCY 214 (Aging and the Aged: Social Gerontology), SOCY 315 (Race and Ethnic Relations), SOCY 316 (Social Psychology), SOCY 230 (Criminology), SOCY 338 (Sociology of Deviance), ANTH 323 (Culture and Personality) or ANTH 328 (Male/Female) may be credited as general electives in psychology.

Sociology requirements: 30 credits of sociology and the required related courses as listed under the sociology major. One course from PSYC 227 (Development of the Child and Adolescent), PSYC 228 (Life Span Human Development), PSYC 317 (Social Psychology) or PSYC 335 (Personality Theory) may be credited as an elective in sociology. PSYC 211 (Principles of Statistics and Experimental Design I) or PSYC 212 (Principles of Statistics and Experimental Design II) may be substituted for MATH 130 (Elements of Statistics).

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. PHIL 201 (Philosophical Psychology), PHIL 202 (Philosophies of Love and Sexuality) and PHIL 211 (Introduction to Logic) may be credited as psychology general electives, as long as neither is used as the required related philosophy course.

Philosophy requirements: 30 credits of philosophy and the required related courses as listed under the philosophy major. PSYC 454 (History and Systems of Psychology) may be credited as an elective in philosophy.

Psychology-Special Education Double Major**(B.A. and B.S.Ed.): 133 s.h.**

Special Education requirements: See the *Special Education* section of the catalog.

Psychology requirements: 33 s.h. of psychology as listed above for the psychology major. PSYC 437 (Abnormal Psychology) may be counted as both a special education elective and as a psychology core elective. PSYC 227 (Development of the Child and Adolescent) or PSYC 228 (Life Span Human Development) may be counted as both a special education required related course and as a psychology core elective. Both SPED 212 (Psychological Aspects of Individuals with Disabilities) and SPED 325 (Principles of Behavior Management) may be counted as both special education required courses and as psychology general electives. Required related courses are the same as for a psychology major. Refer to Admission to Advanced *Professional Studies and Certification* (Education Majors) in this catalog for more information.

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**

An introduction to research methods and design and to statistical analysis of psychological data. 3 hrs. lec., 2 hrs. lab. Prereq: PSYC 100.

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.

PSYC 227: 3 s.h.**Development of the Child and Adolescent (G3, W)***

A study of the theory and research pertaining to the growth, development and behavior of children through adolescence. Prereq: ENGL 110 and PSYC 100. No course credit given if credit earned for separate course in child psychology or adolescent psychology. No credit given if credit earned for PSYC 228.

PSYC 228: 3 s.h.**Life Span Human Development (G3, W)***

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 in fall, spring. 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 in spring. 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 inter-group relations. Offered in fall, spring.

PSYC 256: 3 s.h.**Psychology of Human Adjustment (G3, W)**

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 annually. Prereq: ENGL 110 and 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 addictions. Evaluations of opiates, stimulants, barbiturates, depressants, hallucinogens, marijuana and alcohol, with consideration of the effects of these drugs on the individual. Offered in fall, spring. Prereq: ENGL 110 and PSYC 100 or SOWK 211.

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 in fall, spring. Prereq: PSYC 211 and 212 with a grade of C- or higher. No credit given if credit earned in PSYC/CSCI 350.

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 in 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 annually. 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 in 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 annually. Prereq: ENGL 110.

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

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 in 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 in 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 in fall. Prereq: PSYC 211 or permission of instructor.

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: completion of fundamentals component of general education, COMM 100, ENGL 110 and junior status.

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 in fall. Prereq: PSYC 100 and PSYC 227, 228 or 256.

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 multi-generational family system on the individual. Assessment of functional and dysfunctional family systems. Emphasis upon theorists and their orientations and intervention strategies. Offered in spring. 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 in fall. Prereq: PSYC 100 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 upon issues in test construction and design, evaluations of psychometric properties and applications of tests in various fields of psychology. Offered fall or spring. Prereq: PSYC 211 or permission of instructor.

PSYC 437: 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/Senior status.

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 in fall. Prereq: PSYC 100.

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 in fall, spring. 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 annually. 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 in 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. Offered in fall, spring. Prereq: Permission of instructor.

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 537: 3 s.h.
Introduction to Assessment and Intervention

PSYC 546: 3 s.h.
Learning Theories and Their Application

PSYC 547: 3 s.h.
Applied Social Psychology

PSYC 566: 3 s.h.
Clinical Hypnosis

PUBLIC RELATIONS

See Communication & Theatre

RESPIRATORY THERAPY

See Biology

RUSSIAN

See Foreign Languages

SECONDARY EDUCATION

See Educational Foundations

SOCIAL SCIENCES

School of Humanities and Social Sciences

SSCI 201H 3 s.h.

The Western Intellectual Tradition I (G3, W)

Main currents of thought in Western civilization from the ancient world through the Enlightenment, focusing on seminal thinkers and their impact on the culture of the West. Offered annually. Prereq: member, University Honors College or 3.35 GPA and ENGL110H.

SSCI 202H 3 s.h.

The Western Intellectual Tradition II (G3, W)

Main currents of thought in Western civilization since the French Revolution, focusing on seminal thinkers and their impact on the culture of the West. Offered annually. Prereq: member, University Honors College or 3.35 GPA 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 in spring.

NOTE: These courses do not satisfy the general education policy; "two courses must be from a single department."

SOCIAL STUDIES

School of 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 adviser, each student will select a concentration of 30 s.h. from among the following disciplines: anthropology, economics, geog-

raphy, government, history, psychology and sociology. 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. 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

School of Humanities and Social Sciences

Professor Gregoire, chairperson

Professors Fulmer, Heintzelman

Assistant Professors Foels, Gantt, Girvin, Johnson, Walsh

The social work program at Millersville University leads to a bachelor of arts degree in social work. 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, the social work department provides a learning environment designed to prepare social work practitioners as lifelong learners able to live in an increasingly diverse, multicultural and technologically complex society. Building on a liberal arts foundation, we seek to develop educated, ethical productive professional social workers able to meet human needs, enhance human well being and promote social and economic justice through generalist social work practice and social action.

Goal 1: To help students integrate liberal arts and professional knowledge, values and skills into competent being generalist practice.

Goal 2: To sensitize students to issues of human diversity and populations at risk and assist them in pursuing equity in professional and institutional relations.

Goal 3: To prepare students to understand social policy issues and participate in efforts directed toward their resolution.

Goal 4: To prepare students to be ethical practitioners.

Goal 5: To motivate and prepare students for continuing professional development and 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 a year-long practicum experience—30 hours during fall semester and 450 hours 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 screening and selection 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.

Millersville's social work baccalaureate program was first professionally accredited by the Council on Social Work Education in 1981 and is currently accredited through June 2011.

There is no foreign language requirement for the social work major; however, fluency in Spanish can be an asset for field placement and for future employment.

COURSE REQUIREMENTS

Social Work Major (B.A.)

SOWK 102, 202, 203, 301-302, 303, 320-321, 401-402, 403-404, 405. A grade of C or higher must be attained in all required social work courses. Nine additional elective credits from SOWK 304, 305, 306, 307, 308, 309, 312, 313, 350. SOWK 401-402 must be taken concurrently with 404 in spring semester. Required related courses: BIOL 204, ECON 100, GOVT 112, PSYC 100, SOCY 210.

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 compet-

ing 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 202: 3 s.h.

Social Welfare as a Social Institution

Introduction to the structure of the social services delivery system and the role of social policy in it; social systems perspective; analysis of agencies as systems; introduction to professional and legal references; analysis of a social problem. Agency volunteer work required. Prereq: SOWK 102 and sophomore status or permission 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. Volunteer work required. Prereq: SOWK 102 and sophomore status or permission of instructor. Prereq or Co-req: BIOL 204, PSYC 100, SOCY 210.

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. Offered in fall. Prereq: ENGL 110, Prereq or Co-req: SOWK 202 and 203. 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. Offered in spring. Prereq: SOWK 301. SOWK majors only.

SOWK 303: 3 s.h.

Social Welfare and the Law

Significant legislation, court decisions and regulatory language that shape public social policy and affect the legal base for social work practice. Among substantive areas discussed are: family law, mental health law, constitutional and civil rights, poverty law (including landlord-tenant relations), legal regulations of human reproduction and sex behavior, education and professional licensing. Offered in fall. Prereq: SOWK 102 or permission of instructor. SOWK majors only.

SOWK 304: 3 s.h.

Social Work and Corrections

Public policy issues and problems in juvenile and adult corrections. Historical perspective, rehabilitation approaches, de-institutionalization, community-based programs and other trends. The correctional system as a subsystem of the criminal justice system; legal offenders and their families as a vulnerable population group. Roles of the social worker in institutional settings, probation and parole, group homes. Field trips to state prisons, county jails and juvenile facilities. Offered in spring.

SOWK 305: 3 s.h.

Social Work and Child Welfare

Concepts, policies and practices in child welfare services as response to 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. Offered in spring.

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. Offered in spring.

SOWK 307: 3 s.h.

Social Work and Health Care

Scope and contribution of professional social work in comprehensive health care settings focusing on individual and community health needs, social and behavioral aspects of illness, essential practice components and skills required of social workers, health care policy, issues and trends, alternative health care programs and research needs. Offered in fall of even years.

SOWK 308: 3 s.h.

Social Work and Alcoholism

Concept, policies, issues, trends, theories and social work practice skills in the setting of alcoholism services. Focuses in interaction of affected individuals with others in family, social, economic, educational, legal and political systems. Examines role of social worker in identification, intervention and use of network of community resources. Offered in spring.

SOWK 309: 3 s.h.

Social Work and Mental Health (W)

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. Offered in fall. Prereq: ENGL 110.

SOWK 312: 3 s.h.**Social Work and Women's Issues (W)**

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. Offered in fall. 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. Offered in fall, spring. Prereq: COMM 100, ENGL 110 and junior status.

SOWK 320: 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. Offered in fall. Prereq: ENGL 110, SOWK 102. SOWK majors only.

SOWK 321: 3 s.h.**Social Work Research**

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. Offered in spring. Prereq: SOWK 320. SOWK majors only.

SOWK 350: 3 s.h.**Encounters in Human Diversity: Dynamic Problem-Solving in the Context of 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. Focus 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. Offered in fall of even years. Prereq: COMM 100, ENGL 110 and junior status.

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. Offered in spring. Prereq: 24 credit hours of social work professional courses. Prereq: SOWK 403 Coreq: SOWK 404, 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, including community, agency and "change-effort" papers. 30 hour field experience required. Offered in fall. Prereq: SOWK 302. SOWK majors only.

SOWK 404: 3 s.h.**Senior Seminar**

The "capstone" course for social work majors is a bridge between the roles of student and practitioner. The course examines issues and concerns facing social workers entering professional practice, synthesizes and integrates knowledge, value and method components with field experiences. Offered in spring. Prereq: SOWK 403 Coreq: SOWK 401-402. SOWK majors only.

SOWK 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 context of human culture and diversity; and 3) knowledge about opportunity structures and how they promote and deter human development and meeting needs. Offered in fall. Prereq: SOWK 301. SOWK majors only.

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 course/thesis and eligibility, refer to the *Special Academic Opportunities* section of this catalog.

SOCIOLOGY/ANTHROPOLOGY**School of Humanities and Social Sciences**

Associate Professor Glazier, chairperson

Professors Arnold, Counihan

Associate Professor Mahaffy, Schmitt

Assistant Professors Porter, Rosenberg, Smith, Trussell

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 Latino 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 which leads 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 rigorous, 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 or peer mentor.

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 re-establish 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 departmental academic 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, 302, 303, 305, 448 and 15 s.h. of electives in sociology. Required related courses: Math 130 (Prereq: for SOCY 302) and 12-18 credits of non-sociology courses.

Sociology Major/Criminology Option (B.A.): 120 s.h.

Required courses: SOCY 101, 302, 303, 305, 448 or co-op/internship and SOCY 230, 331, 332 and 3 s.h. of SOCY 334-339 and 3 s.h. of electives in sociology. Required related courses: MATH 130 (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 chairperson of sociology/anthropology department and see 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, ANTH 323 or 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 criminal justice 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 fall.

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 214: 3 s.h.

Aging and the Aged: Social Gerontology (G3)

Human aging, with emphasis on social, cultural and psychological aspects; an orientation to social gerontology as a multi-disciplinary social science; examination of scientific studies and theories of aging; social situations faced by aging people; societal responses to older people; the prospects of aging in the future. Offered infrequently.

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 in fall, spring. Prereq: 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, linear regression (bivariate and multiple). SPSS software package used. Offered in 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**

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: C- or higher in SOCY 302, SOCY 101 or SOCY 211 and SOCY 303.

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 310: 3 s.h.**Sociology of Religion**

Religion as a social institution; religion and the individual; institutionalization of religion; religion and social change; secularization of society. Offered infrequently.

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, 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 annually. 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 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 health care. 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 infrequently. Prereq: ENGL 110 and 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 are 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.**Introduction to the Criminal Justice System (G3)**

Overview of the American system for the administration of justice focused on the apprehension, prosecution and adjudication of criminal defendants. Offered in fall. 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. Offered in spring. 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 SOCY 230 or permission of instructor.

SOCY 342: 3 s.h.**Japanese Society**

An interdisciplinary approach to Japanese culture and society focusing on the arts, humanities and social sciences. Includes traditional culture, social institutions, socialization and Japanese national character. Offered infrequently. Prereq: a sociology course (101 or any number not above 216) or an anthropology course (any course number between 220 and 323); and at least one course from another social science.

SOCY 441: 3 s.h.**Urban Society**

Historical development of cities from pre-industrial towns and villages to contemporary metropolitan regions; structure and ecology of the city; urban culture, subcultures and personality patterns. 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 in fall, spring. 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 fall semester.

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 annually.

ANTH 220: 3 s.h.**Ethnographic Methods**

Introduces ethnographic research methods through individual or group fieldwork, emphasizing the ethnographic interview and participant observation. Prereq: permission of instructor.

ANTH 221: 3 s.h.**Peoples and Cultures of Mexico (G3)**

Examines the cultures of the native and peasant societies of Mexico from an archaeological, ethnohistoric and ethnographic perspective. The culture-ecological evolutionary approach is emphasized. Offered infrequently.

ANTH 222: 3 s.h.**North American Indians (G3, W)**

Examination of past and present cultures of the native peoples of North America. Offered infrequently. 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.**Archeological 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 322: 3 s.h.**Food and Culture (G3, W)**

Cross-cultural study of food habits and beliefs in tribal societies and the U.S. Examines the extent and causes of hunger in the U.S. and in the Third World and considers religious fasting, anorexia nervosa and famine. Offered annually. Prereq: ENGL 110.

ANTH 323: 3 s.h.**Culture and Personality (G3)**

Cross-cultural study of the relationship between culture and personality development. Theory, method and applications of psychological anthropology. Comparative studies of patterns of ethnic behavior, mental disorders, addiction and the crisis cult phenomenon. Offered periodically.

ANTH 324: 3 s.h.**Human Spatial Behavior**

Examines humankind's perception and use of space. Primary focus is on the comparative study of social organization and its relation to spatial characteristics. Spatial behavior is examined from the perspectives of archaeology, ethnography, psychology, ethnology and architecture. Offered infrequently.

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 328: 3 s.h.**Male/Female (G3)**

Cross-cultural study of sex roles among Western and non-Western societies, including social concepts of the masculine and feminine and biological aspects of gender. 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 periodically. 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 U.S. and other cultures. An interdisciplinary and comparative examination of the ways social categories define, limit and liberate human potential. Offered periodically. 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 which include the summer 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 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. Prerequisite 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.

ANTH 586: 3-6 s.h.**Topics in Anthropology**

Offered periodically.

SPANISH

See Foreign Languages

SPECIAL EDUCATION

School of Education

Associate Professor Rohena, chairperson

Professor Ridley

Associate Professors Edeh-Herr, Neuville, Papalia-Berardi, Rohena

Assistant Professor Long, Mehrenberg

The special education program at Millersville University prepares students to teach individuals with disabilities. **Major changes to the various certifications and to certification programs are anticipated at the direction of the Pennsylvania Department of Education. Please consult with your academic adviser.**

Currently students who complete the special education program at Millersville receive a bachelor of science in education degree and may apply for a Pennsylvania Instructional I teaching certificate. This comprehensive certificate allows students to teach children from preschool through 12th grade (N-12 or ages 3-21), specifically individuals identified as developmentally delayed, learning disabled, mentally retarded, seriously emotionally disturbed, autistic or pervasively developmentally disordered, orthopedically impaired, health impaired, neurologically impaired or multiply disabled. According to current Pennsylvania regulations and standards, this certificate may be made permanent upon the completion of 24 post-baccalaureate credits, three years of satisfactory teaching in one's field of certification and completion of an induction year program.

Students are encouraged to elect a double major (special education and elementary education) with dual certification (special education and elementary education) through a cooperative program offered by both academic departments. Both majors will be recorded on the student's transcript.

Practicum experiences in the local schools are required during the junior-senior years in conjunction with five courses of the special education professional block. The student teaching program offers two different training experiences during the senior year. Students then demonstrate effective teaching skills by applying them in individual, small and large group teaching formats to maximize the educational outcomes achieved by individuals with disabilities.

Prerequisites for Student Teaching

A current student shall successfully complete with a “C” or higher all major required courses (i.e., PSYC 100, 227 or 228, ELED 424 or 425, MATH 104 and 105, EDFN 211, EDFN 241, EDFN 333, EDUC 220, SPED 101, 102, 212, 325, 326, 327, 328 and two electives) and attain an overall 3.0 GPA before engaging in SPED 325 and 328, and the pre-student teaching block (SPED 431, 432, 433, 434 and 436) or student teaching. Upon successful completion of the program at MU, a graduate will be able to perform satisfactorily as a teacher in a self-contained classroom or resource room, as an itinerant teacher and/or as a professional resource/consultant to regular classroom personnel.

The department encourages all the special education majors to join the University student chapter of the Council for Exceptional Children (CEC), which has been chartered by the national CEC and which has been active on the MU campus since 1965 (Chapter No. 440). The University CEC chapter offers students opportunities to work directly with individuals with disabilities on and off campus, receive professional newsletters, publications and information, attend state, national and international conferences regarding exceptional children as well as develop leadership abilities. Students are also encouraged to join the student chapter of the Pennsylvania State Education Association (PSEA) and may become active in the national Best Buddies program.

The Department of Special Education also offers 500-level elective courses at the graduate level for its upperclass majors and other interested upper-class students. (See the *Graduate Catalog* for course descriptions.)

COURSE REQUIREMENTS

Special Education Major (B.S.Ed.): 120 s.h.

N-12 Certification in Special Education

Major Sequence Requirements: SPED 101, 102, 212, 325, 326, 327, 328 and two electives: SPED 313, 314, 315, 316, 317, 318. SPED 325 and 328 require advanced professional studies status prior to registration.

Professional Education Core: EDUC 220, EDFN 211, EDFN 241, EDFN 333; Required Related Courses: MATH 104 and 105, PSYC 100 and 227 or 228; EDUC 424 or 425.

Special Education Professional Block: Must be taken after all required courses have been completed with a “C” or higher: SPED 431, 432, 433, 434, 436; Student Teaching, EDSP 461, 462. Admission to advanced professional studies requires student to have earned 60 credits and have overall 3.0 GPA, completed PRAXIS Part 1 (PPST), two English courses, one being a literature, two college math courses, passed a laboratory science course and have completed a background check including satisfactory reports for FBI, Act 34 and Act 151. See specific courses for this requirement. Refer to *Admission to Advanced Professional Studies and Certification* (Education Majors) in this catalog for more information.

COURSE DESCRIPTIONS

SPED 101: 3 s.h.

Orientation to Special Education

Introduction for special education majors, elementary education majors and elementary education/special education majors emphasizing various theoretical aspects in the field. Includes historical and legal considerations, educational and developmental needs of students with exceptionalities, special education programs, services, resources and materials. Emphasis on practical exposure to individuals with disabilities and their learning and behavioral challenges. Offered fall, spring, summer.

SPED 102: 3 s.h.

National, State and Community Resources

Acquaints students with national, state and community organizations and services available for families and individuals with disabilities. May include visits and guest lectures focusing on interest groups and organizations whose major goals involve helping persons with disabilities. Emphasis on the role of the teacher in facilitating and organizing resources and people. Offered in fall, spring.

SPED 212: 3 s.h.

Psychological Aspects of Individuals with Disabilities

Psychological and sociological aspects of individuals with disabilities are surveyed. Environmental and socio-cultural factors are emphasized and analyzed in relation to human adjustment and social roles. Coherent educational service recommendations and whole person assessment concepts are explored. The history of services, socially constructed definitions and characteristics of disability movement form a basis for understanding. Offered in fall, spring. Prereq: SPED 101.

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. Prereq: ELED 100 and Foundations Block 1 (EDFN 211, 241, EDUC 220). Course may be taken as a co-requisite with Foundations Block 1.

SPED 313: 3 s.h.

Psychological and Sociological Aspects of Students with Intellectual Disabilities (W)

Gives the student in-depth knowledge in psychological and sociological aspects of people with mental retardation. Includes lectures, discussions

and research reports concerning historical information regarding treatment and social movements, theoretical approaches, education and historical/sociological perspectives. Offered annually. Prereq: ENGL 110, All SPED 100 and 200 level courses or permission from department chair.

SPED 314: 3 s.h.

Psychological and Sociological Aspects of the Students with Behavior Disorders

Includes the conceptual models, classification and assessment, social and biological factors; covers the main facets of disordered behavior, emotional disabilities and their implications in education. Offered annually. Prereq: All SPED 100 and 200 level courses or permission of the department chair.

SPED 315: 3 s.h.

Psychological, Sociological and Educational Aspects of Students with Learning Disabilities (W)

Includes lectures, discussions, research reports and assignments concerning etiology, behavioral characteristics, theoretical approaches, adjustment problems and educational interventions related to persons with learning disabilities. Offered annually. Prereq: ENGL 110, all SPED 100 and 200 level courses or permission of the department chair.

SPED 316: 3 s.h.

Psychological and Sociological Aspects of Students with Physical Disabilities (W)

Includes lectures, discussions and research reports concerning etiology and syndromes, symptom groupings, theoretical approaches, education and adjustment problems related to persons with physical or orthopedic disabilities, health impairments and multiple disabilities. Offered periodically. Prereq: ENGL 110, all SPED 100 and 200 level courses or permission of the department chair.

SPED 317: 3 s.h.

Expressive Disorders for Students with Disabilities

Develops competencies in identifying and teaching students with disabilities who also have expressive disorders in speech and/or language. The etiology and identification of expressive disorders will be noted with emphasis on how to reinforce in the classroom setting the recommendations provided by speech clinicians and/or language clinicians. Offered periodically. Prereq: all SPED 100 and 200 level courses or permission of the department chair.

SPED 318: 3 s.h.

Special Education for Infants, Toddlers and Preschoolers with Developmental Disabilities (W)

Examines the implications of federal mandates for providing educational and supportive services for infants/toddlers/preschoolers with disabilities and their families. Includes identification of, and leadership responsibilities of, personnel involved with infant and early intervention programs and assessing, analyzing and interpreting data from formal and informal sources to be utilized in developing the Individualized Family Service Plans (IFSPs) are discussed. Offered periodically. Prereq: ENGL 110, all SPED 100 and 200 level courses or permission of department chair.

SPED 325: 3 s.h.

Principles of Behavior Management

Fundamental knowledge and skills in teaching individuals with disabilities using behavioral intervention strategies. Includes analysis of student classroom behaviors, assessing strengths and needs in these behaviors and determining behavioral objectives via the application of learning principles. Offered in fall, spring. Prereq: All SPED 100 level courses; all 200 level courses including professional block I; admission to advanced professional studies.

SPED 326: 3 s.h.

Teaching Reading and Communication Skills to Students with Mild and Moderate Disabilities

Methods for teaching reading and the language arts to individuals with mild and moderate disabilities. Skills will be taught through class exercises, lectures, discussion and development of student materials. Offered in spring. Prereq: All SPED 100 level courses; all 200 level courses including professional block I.

SPED 327: 3 s.h.

Teaching Inquiry Skills to Students with Mild and Moderate Disabilities

Methods for determining strategies, environments and resources for supporting students with disabilities acquiring science and social studies content. Emphasis is on relevant content, meeting curricular standards and establishing citizenship behavior. Offered in fall. Prereq: all SPED 100 level courses; all 200 level courses including professional block I.

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 assessments developed in prerequisite courses is demonstrated. Offered in fall, spring. Prereq: all SPED 100 level courses; all 200 level courses including professional block I; 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 in summer. Prereq: COMM 100, ENGL 110 and junior status.

SPED 431: 3 s.h.

Prescriptive Teaching for Students with Severe and Multiple Disabilities

Best teaching practices for individuals with severe disabilities functioning at the early childhood through secondary level and who require intervention strategies for basic skill development and community based domains. Offered in fall, spring. Prereq: SPED 100, 200 and 300 level courses; admission to advanced professional studies.

SPED 432: 3 s.h.**Curriculum and Methods for Students with Mild and Moderate Disabilities at the Primary and Preschool Level (W)**

Develops competencies to identify the curriculum content and implement effective methodologies needed to direct the educational program for individuals with exceptionalities whose mental, physical, social and/or emotional levels are pre-academic. Offered in fall, spring. Prereq: ENGL 110, SPED 100, 200 and 300 level courses; admission to advanced professional studies.

SPED 433: 3 s.h.**Current Issues and Trends in Special Education**

Designed for students to use emerging concepts, current issues and practices in the education of students with disabilities. Explores: teaching variables, instructional materials, information technology, materials and service delivery models. Students will acquire professional skills for communicating and collaborating with parents and colleagues and for dealing effectively with affective job related issues. Offered in fall, spring. Prereq: SPED 100, 200 and 300 level courses; admission to advanced professional studies.

SPED 434: 3 s.h.**Transition Planning and Secondary Programming for Individuals with Disabilities**

Students survey, develop, plan and select pre-vocational, vocational and career goals for individuals with mental and physical disabilities. Individualized Transitional Planning is discussed and incorporated into the class. Includes techniques and procedures for referring and placing individuals with disabilities in potential training and job settings. Offered in fall, spring. Prereq: SPED 100, 200 and 300 level courses; admission to advanced professional studies.

SPED 436: 3 s.h.**Individual Programming and Instructional Management for Students with Mild and Moderate Disabilities**

Develops competencies in developing Individual Education Programs and instructional management. Consists of those strategies which make possible the delivery of curricula in special education settings. Offered in fall, spring. Prereq: SPED 100, 200 and 300 level courses; admission to advanced professional studies.

EDSP 461: 6 s.h.**Student Teaching-Special Education: 1st Half Semester****EDSP 462: 6 s.h.****Student Teaching-Special Education: 2nd Half Semester**

Two full-time practicum experiences where students have an opportunity to apply educational strategies and interventions for students with mild, moderate and severe disabilities. (See *Academic Policies; Student Teaching, Application and Eligibility; Student Teaching, Transfer Students*).

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

The following 500 level courses are open to qualified undergraduates with permission. For course descriptions, please refer to the *Graduate Catalog*.

SPED 527: 3 s.h.**Exact Signing: Methods of Nonverbal Communication for Individuals with Disabilities****SPED 575: 3 s.h.****Training and Utilization of Paraeducators in Special Education****SPED 576: 3 s.h.****The Student with Disabilities in the Regular Education Classroom****SPED 578: 3 s.h.****Special Education Law for Students with Disabilities****SPED 580: 3 s.h.****Diagnostics and Assessment Strategies for Students with Disabilities****SPED 586-598: 3 s.h.****Topics in Special Education****STATISTICS**

See Mathematics

TECHNOLOGY EDUCATION

See Industry & Technology

UNIV 103

See Freshman Year Inquiry

WELLNESS AND SPORT SCIENCES

School of Education

Associate Professor Lombardi, chairperson
 Professors Mowrey, Wushanley
 Associate Professors Audette, Halawa, Keefer, Nesbitt, Wimer
 Assistant Professors Dupain, Ruzsak, Schaeffer

WSSD Mission: The Wellness & Sport Sciences department strives to improve the personal and professional lives of Millersville University students and 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 352: Health Education in Elementary Schools 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 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 and Sport Sciences section of this catalog.

COURSE REQUIREMENTS

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. MU-WCU-athletic training credits earned via distance learning and one summer of mandatory course work 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: Choose one of the following: 3 s.h.

WSSD 482: 3 s.h.

Coaching Effectiveness

WSSD 486: 3 s.h.

Performance Enhancement Techniques

WSSD 582: 3 s.h.

Sport Psychology

WSSD 484: 3 s.h.

Psycho-Social Foundations of Coaching

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 486: 3 s.h.

Topics*

Allowable Substitutions:

WSSD 591: 3 s.h.

Exercise Physiology

WSSD 551: 3 s.h.

Coaching of Sport

*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, stress management, AIDS and STDs prevention, addictive behaviors and 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 352: 3 s.h.

**Health Education in Elementary Schools
(Education Majors Only)**

A survey of health content, history, philosophies, curriculum, textbooks and teaching aids for elementary and special education majors. Offered in 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 in 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 an 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 395: 3 s.h.

Leisure Activities for the Aged

WSSD 450: 3 s.h.

Kinesiological and Physiological Foundation of Coaching

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, 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 for 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 like 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**

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 student 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.**Medical-Legal Aspects of Coaching**

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 in fall, spring.

WSSD 484: 3 s.h.**Psycho-Social Foundations of Sport**

The psycho-social factors affecting human behavior in modern society as applied to coaching situations and the historical development of sports programs. Offered periodically.

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

Associate Professor Weis, 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, WSTU 330 and WSTU 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 adviser.

COURSE DESCRIPTIONS

WSTU 220: 3 s.h.**Introduction to Women's Studies (G3)**

Interdisciplinary and multi-cultural study of women's roles and relationships and the ways these 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 488: 3 s.h.**Women's Studies Senior Seminar (G3, W)**

Interdisciplinary and multi-cultural 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 328****Male/Female (G3)****ANTH 344****Gender, Race and Class (P)****BUAD 405****Topics: Gender and Diversity****COMM 330****Media and Women's Culture (P)****ECON 327****Women & 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 Health Care (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)
WSSD 486
Topics: Women in Sport



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Associate Athletic Director.....	G. Anthony Grant, Ph.D.
Associate Athletic Director	Stephen P. Roach, M.S.
Director of Intramurals, Campus Recreation & Club Sports	Gordon Nesbitt, Ph.D.
Assistant Vice President for Student Affairs and Director of Financial Aid	Dwight G. Horsey, M.Ed.
Associate Director of Financial Aid	Marcy Ashton, B.A.
Interim Director of Health Services.....	John C. Rigilano, M.D.
Chief, University Police	Wayne W. Silcox, M.S.
Deputy Chief, University Police.....	Anthony Floyd, B.S.
Coordinator of Wellness & the Women's Center	Jayne L. Trogus, M.P.H.
Director of Career Services	Margo Sassaman, M.S.
Assistant Director of Career Services.....	Melissa Fitzgerald, M.S.

FINANCE AND ADMINISTRATION

Vice President for Finance and Administration	Roger V. Bruszewski, M.B.A.
Associate Vice President for Finance and Administration.....	Kenneth E. Dearstyne, Jr., M.B.A.
Bursar	Doris Conlin, B.S.
Director of Budget.....	Dawn E. Reese
Director of Accounting	Teh P. Krajan, B.S.
Director of Dining and Conference Services	Edward M. Nase, B.S.
Associate Vice President for Human Resources.....	Louis P. DeSol, M.P.A.
Director of Personnel Services.....	Diana A. Lyon, B.A.
Director of Payroll.....	Jeanie Pflugrad, B.S.
Director of Capital Construction, Contracting and Design.....	Arthur C. Dickinson, M.S.E.
Director of Maintenance Operations	John E. Colarusso, B.S.
Director of University Services	Barbara Buchanan, M.A.
Director of Purchasing.....	David C. Errickson, M.M.A.
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INFORMATION TECHNOLOGY

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Director of Administrative Information Systems.....	Gail L. Childs, B.S.
Director of Communication and Networking Services	Michael Ondisco, B.S.
Director of Web and Multimedia Services	Diane M. Duell, M.S.
Director of Desktop Support Services.....	Veronica L. Longenecker, M.S.
Manager of Operations and Help Desk.....	Michael A. McDowell, B.A.
Manager of Database Administration.....	Judy A. Swanger, B.S.
Manager of Networking Services	G. Richard Koelsch, B.S.
Manager of Campus Telephone Services.....	Marie E. Roark
Manager of UNIX and Systems Services/Email Administrator.....	Lynne Seamans, B.S.
Manager of Windows and Systems Services.....	Gregory R. Schmalhofer, B.S.

Applications Manager for Student Information	Susan W. Gray, B.S.
Applications Manager for Financial Aid and Advancement	David J. Weigel, B.S.
Applications Manager for Accounts Receivable and Finance.....	Imre Gajari, B.S.
Instructional Designer.....	Al Unrath, M.S.

UNIVERSITY ADVANCEMENT

Vice President for University Advancement	Gerald C. Eckert, M.A.
Assistant Vice President for University Advancement	Amy H. Dmrtzak, M.Ed.
Assistant Vice President for Development	Janet L. Edwards, M.B.A.
Executive Director of Alumni, Special Events and Data Management.....	Steven A. DiGuseppe, B.S.
Director of Alumni Services	A. Dianne O'Connor, B.A.
Director of Special Events	Carol R. Reichler, A.S.
Director of Planned Giving	Francis G. Schodowski, M.B.A.
Director of Development	Martha P. MacAdam, B.A.
Assistant Director of Major Gifts	Linda A. Raush, M.A.
Assistant Director of the Annual Fund	Maura L. Hamburger, B.S.
Director of Campaigns and Special Giving	Mark L. Duncan, B.A.
Director of Foundation and Government Support.....	A. Rene Munoz, Ph.D.
Director of Communications	Janet E. Kacskos, M.A.
Director of Sports Information.....	Ethan T. Hulsey, M.S.
Director of Marketing.....	Elizabeth A. Braungard, B.A.

CHAIRPERSONS OF DEPARTMENTS

School of Education

Educational Foundations.....	John Ward, Ed.D.
Elementary and Early Childhood Education.....	Lillie S. West, Ed.D.
Industry & Technology	Barry G. David, Ed.D.
Psychology	Helena Tuleya-Payne, D.Ed.
Special Education	Elba I. Rohena, Ph.D.
Wellness & Sport Sciences.....	Julie Lombardi, P.E.D.

School of Humanities and Social Sciences

Art.....	Ben Cunningham, M.F.A.
Business Administration.....	Howard Ellis, J.D.
Communication & Theatre.....	Thomas P. Boyle, Ph.D.
Economics.....	Kenneth W. Smith, Ph.D.
English.....	Beverly Schneller, Ph.D.
Foreign Languages.....	Christine Gaudry-Hudson, Ph.D.
Geography.....	Angela Cuthbert, Ph.D.
Government & Political Affairs.....	Richard Glenn, Ph.D.
History	Francis J. Bremer, Ph.D.
Music.....	Mícheál Houlahan, Ph.D.
Philosophy.....	William G. Smith, Ph.D.
Social Work	Kathryn A. Gregoire, Ph.D.
Sociology/Anthropology.....	Mary Glazier, Ph.D.

School of Science and Mathematics

Biology	Joel B. Piperberg, Ph.D.
Chemistry	Sandra L. Turchi-Dooley, Ph.D.
Computer Science.....	David H. Hutchens, Ph.D.
Earth Sciences	Richard D. Clark, Ph.D.
Mathematics.....	Delray J. Schultz, Ph.D.

Nursing	Barbara J. Zimmerman, D.N.Sc.
Physics	Michael J. Nolan, Ph.D.

Service Departments

Counseling and Human Development.....	Kelsey K. Backels, Ph.D.
Academic Student Development.....	Ralph G. Anttonen, Ph.D.
University Library.....	Jessica George, M.L.S.

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- Bruszewski, Roger V.** (2006). State University of New York, Plattsburgh, 1976; M.S., Youngstown State University, 1977. Vice President for Finance and Administration
- Eckert, Gerald C.** (1984). B.A., St. John Fisher College, 1967; M.A., State University of New York, 1971. Vice President for University Advancement
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- Bray, Jane S.** (2001). B.S., Kutztown University, 1972; M.Ed., Ibid., 1974; Ed.D., Lehigh University, 1994. Dean, School of Education
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FACULTY

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- Dreon, Oliver** (2008). B.S., University of Pittsburgh, 1991; M.A., *Ibid.*, 1992; Ph.D., Penn State University, 2008. Assistant Professor of Educational Foundations
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- Elliott, Anthony** (2002). B.S., Indiana University of Pennsylvania, 1976; M.F.A., Catholic University, 1982. Associate Professor of Theatre
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- Frankum, Ronald B.** (2003). B.A., Syracuse University, 1988; M.A., University of Kentucky, 1991; Ph.D., Syracuse University, 1997. Associate Professor, Department of History
- Frazer, J. Douglas** (1979). B.A., Western Maryland College, 1975; M.M., Northwestern University, 1977; CPA (Pennsylvania), 1978; Ph.D., Temple University, 1987. Professor of Business Administration
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- Fulmer, Richard H.** (1985). B.A., Bloomsburg University, 1966; M.S.W., University of Pennsylvania, 1973; M.L.S.P., Bryn Mawr College, 1982; Ph.D., Ibid., 1987. Professor of Social Work
- Galante, Joseph J.** (1998). B.B.A., Iona College, 1978; M.B.A., Ibid., 1980; M.A., Rutgers University, 1989; J.D., The Thomas M. Cooley Law School, 1992. Associate Professor of Business Administration; Director of VITA Program
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- 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; Chairperson, Department of Educational Foundations
- Warmkessel, Marjorie M.** (1978). B.A., Goucher College, 1976; M.S.L.S., University of North Carolina, 1977; M.A., Rutgers University, 1988; Ph.D., *Ibid.*, 1997. Professor of Librarianship, Interim Director of Library Services

- 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 Elementary and Early Childhood Education
- West, Lillie S.** (1997). B.S., Shippensburg University, 1970; M.Ed., Wayne State University, 1974; Ed.D., Mississippi State University, 1998. Associate Professor of Elementary and Early Childhood Education, Assistant Chairperson, Department of Elementary and Early Childhood 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. Associate Professor, Department of Mathematics
- White, Michelle M.** (2002). B.A., Youngstown State University, 1971; M.S., Ibid., 1973; Ed.D., University of Akron, 2000. Associate Professor, Director of Academic Advisement
- 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; Department of Music
- Wimer, Jeffrey W.** (2002). B.S.Ed., Slippery Rock University, 1989; M.S., Ohio University, 1990; Ph.D., University of Dayton, 2000. Associate Professor, Department 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
- Wismer, Robert K.** (1976). B.S., Haverford College, 1967; Ph.D., Iowa State University, 1972. Professor of Chemistry
- Wolf, William W.** (1989). B.A., St. Olaf College, 1965; M.A., University of Missouri-Columbia, 1970; Ph.D., Ibid., 1974. Assistant Professor of Art
- Woo, Tae O.** (1982). B.A., Seoul National University, 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
- 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 Industry & Technology
- Wushanley, Ying** (1996). B.S., Shanghai Teachers' University, 1982; M.S., Washington State University, 1991; Ph.D., 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)
- 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
- Zegers, David A.** (1977). B.S., University of Illinois, 1970; M.A., University of Colorado, 1972; Ph.D., Ibid., 1977. Professor of Biology
- Zhan, Mingquan** (2003). B.S., Nanjing Normal University, 1990; M.S., Ibid., 1997. Associate Professor, Department 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
- Zhong, Yuan** (2008). B.S., Huazhong Normal University (China), 1986; M.S., Guangxi Agricultural University (China), 1989; Ph.D., University of New Brunswick, 1996. Assistant Professor of Biology.
- Zimmerman, Barbara J.** (1987). B.S.N., Pennsylvania State University, 1974; M.S., University of Delaware, 1985; D.N.Sc., Widener University, 1996. Professor of Nursing, Chairperson, Department of Nursing
- Zoppetti, Gary M.** (2002) B.S., California University of PA, 1992; M.S., University of Delaware, 1997; Ph.D., Ibid., 2001; Associate Professor, Department 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
- Dixon, Ned S.** (1987). B.A., St. Olaf College, 1971; M.S., Stanford University, 1973; Ph.D., Ibid., 1980. Assistant Professor of Physics
- Dougherty, Dennis C.** (1998). B.A., University of Wisconsin-Madison, 1978. Instructor of English
- 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
- Greco, Catherine B.** (1990). B.S., Lebanon Valley College, 1971; M.Ed., University of Delaware, 1972. Instructor of Chemistry
- Lauris, William** (1986). B.S., Millersville University, 1964; M.Ed., West Chester State College, 1968. Instructor of Educational Foundations

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:

Bakken, William, B.S., Lincoln University, 1970; M.D., Temple University, 1974; Lancaster General Hospital Family Practice Residency, 1977; American Academy Family Practitioners Board Certification, 1995. Private practice.

Fisher, Todd R., B.S., Muhlenberg College, 1981; M.D., Pennsylvania State University College of Medicine, 1985; Harrisburg Hospital Family Practice Residency, 1988; American Academy Family Practice Board Certification 1995. Private practice.

Gard, Cheryl A., B.S.N., Pennsylvania State University, 1985; M.S.N., University of Maryland, 1996; Adult Nurse Practitioner Certification, 1996; Women's Health Nurse Practitioner, 1996. Practice: Drs. Eichenlaub and May, OBGYN

Gort-Walton, Linda, B.S.N., University of Delaware, 1982; M.S.N., University of Delaware, 1990; Post Masters Certificate, Widener University, 1996; Family Nurse Practitioner Certificate, American Nurses Credential Center, 1996. Practice: Southeast Health Clinic, Family Practice Associates of Lancaster.

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.

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.

Knaub, Marilyn A., B.S., Lebanon Valley College, 1975; M.S., Medical College of Pennsylvania, 1979; American Academy Family Practice Board Certification, F.A.A. F. P., 1986. Medical Director, Southeast Health Clinic.

Krantz, Tania S., R.N., St. Joseph Hospital School of Nursing, 1990; B.S.N., Millersville University, 1991; M.S.N., Old Dominion University, 1994; American Nurses Credentialing Center Family Nurse Practitioner Certification, 1995. Practice: East Petersburg Family Health Center.

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.

Rast, Mark L., Sc.B., Brown University, 1982; M.S., University of Pennsylvania, 1987; Residency in Family Practice Ventura County Medical Center, 1990; American Board of Family Practice Certification, 1996; Practice: Lancaster General Hospital Department of Family Medicine.

Stream, Charles E., B.S., Juniata College, 1987; M.P.H., George Washington University, 1997; George Washington University Physician Assistant Certification, 1994. Practice: Family Practice Associates of Lancaster.

Sturgis, Donita M., B.S.N., University of Michigan, 1991; M.S.N., Widener University, 1995; American Nurses Credentialing Center Certification, 1995; American Academy of Nurse Practitioners Certification, 1995. Practice: Susquehanna Family Health Center.

Szada, MaryJo, A.A., Harrisburg Area Community College, 1979; B.S., Elizabethtown College, 1983; M.D., Autonomous University of Guadalajara, 1989; Private practice.

Wolfe, Dwight, D., B.S., Pennsylvania State University, 1975; M.D., Jefferson Medical College, 1977; American Board of Family Practice Certification, 1992; American Board of Family Practice Certificate in Geriatrics, 1988; Medical Review Officer Counsel Certification, 1994. Private practice.

Medical Technology:

Darr, Carolyn S. B.S., York College, 1972; MT, York Hospital, 1972; MT (ASCP), 1972; M.A., Central Michigan University, 1980; Program Director, Clinical Laboratory Science Program, York Hospital.

Davis, Abby W. B.S., Albright College, 1988; M.D., Pennsylvania State University, 1994; Am Board of Pathology Certification, 1999. Medical Director, Clinical Laboratory Science Program, York Hospital

Gayle, Wendy S., B.A., Temple University, 1989; MT (ASCP), CLS (NCA), U.S. Air Force Biomedical Laboratory Officer Internship Program, 1991; M.S., Concordia College, 2004. Coordinator, Clinical Laboratory Science Program, Lancaster General College of Nursing and Health Sciences.

Nuclear Medicine:

Aten-Longenecker, Penni, B.S., Millersville University, 1985; CNMT, 1985; M.Ed. Pennsylvania State University, 2001. Program Director, School of Nuclear Medicine Technology, Lancaster General College of Nursing and Health Sciences.

Barkdoll, Theresa, A.A., Hagerstown Community College; ARRT 1994; CNMT 1994. Clinical Supervisor, Washington County Hospital.

Basarab, Robert, B.A., Cornell University, 1974; M.D., Medical College of Pennsylvania, 1978. Medical Director, Department of Nuclear Medicine, Lancaster General Hospital.

Corcoran, Robert J., M.D., Tulane University, 1970; ABR 1974; ABNM 1975. Chief, Division of Nuclear Medicine, Peninsula Regional Medical Center.

Davis, Abby W., B.S., Albright College, 1988; M.D., Pennsylvania State University, 1994; Am. Board of Pathology Certification, 1999. Medical Director, Clinical Laboratory Science Program, York Hospital.

DiPietro, Richard, B.S., Franklin & Marshall College, 1958; D.O., Pennsylvania College of Osteopathic Medicine, 1962. Chief of Division of Nuclear Medicine, Memorial Hospital, York.

Eberle, Dwayne, B.S., York College, 1987; CNMT 1987. Clinical Supervisor, Nuclear Medicine, Lewistown Hospital.

Horst, Jessica, B.S., Bloomsburg University, 2005; RT(N) 2005; CNMT 2005. Clinical Supervisor, Nuclear Medicine, Good Samaritan Hospital.

James, Cherie, A.A.S., Reading Area Community College, 1980; AART(N) 1980; CNMT 1980. Clinical Supervisor, Nuclear Medicine, Reading Hospital and Medical Center.

Ladd, Christopher D., B.S., University of Dayton, 1985; M.D., Medical College of Ohio, 1991; ABR, 1996. Medical Director, Nuclear Medicine, Carlisle Regional Medical Center

Levin, Robert, M.D., University of Pittsburgh, 1977; ARB 1983. Medical Director, Nuclear Medicine, Lewistown Hospital.

Magrim, Martin, M.D., University of Maryland, 1973; ABN, ABNM 2002. Affiliate Medical Director, Nuclear Medicine, Washington County Hospital.

Mancini, Paula, B.S., Millersville University, 1987; M.H.A., Penn State University, 2002; AART 1987; CNMT 1987. Clinical Coordinator, Nuclear Medicine Program, Lancaster General College of Nursing and Health Sciences.

Miles, Connie, B. S., Millersville University, 1993; AART 1994; CNMT 1994. Clinical Supervisor, Nuclear Medicine, Lancaster General Hospital.

Nguyen, Jennifer, B.S., York College, 1998; CNMT 1998; Clinical Supervisor, Nuclear Medicine, York Hospital.

Shi, Cindy, M.D., Ph.D., Shanghai Medical University, 1989; ABR 1999; ABNM 1999. Medical Director, Nuclear Medicine, York Hospital.

Stieg, Philip, M.D., Johns Hopkins University, 1970; ABR 1976. Medical Director, Nuclear Medicine, Good Samaritan Hospital.

Terrazas, Omar, B.S., University of Saint Francis, 2002; AART(R) 1992; CNMT 1993. Clinical Supervisor, Nuclear Medicine, Carlisle Regional Medical Center.

Wible, Robin, B.S., Millersville University, 1984; CNMT 1984. Clinical Supervisor, Nuclear Medicine, Memorial Hospital, York.

Williams, Milton, Naval School of Health Sciences, AART 1979; CNMT 1990. Clinical Supervisor, Peninsula Regional Medical Center.

Winn, Randall S., M.D., University of Kansas, 1976; ABR 1980; ABNM 1981. Medical Director, Nuclear Medicine, Reading Hospital & Medical Center.

Respiratory Therapy:

Chrissos, Elaine, B.S. Ed., Millersville University, 1980; Millersville University Program in Respiratory Therapy, 1988; RRT 1989. Neonatal Pediatric Specialist, Director of Clinical Education.

Hughes, John M., A.S., York College, 1972; St. Joseph Hospital School of Respiratory Therapy, 1972; RRT, 1973; BPS, Elizabethtown College, 1981; M.Ed., Pennsylvania State University, 1994. Program Director, Certified Asthma Educator AE-C, 2005.

Rozans, Mark H., M.D., George Washington University, 1996; Pulmonary Subspecialty Board Certification, 1992; Critical Care Subspecialty Board Certification, 1993. Medical Director.

FACULTY EMERITI

Abromaitis, Joseph J. (1969-2002). B.S., M.S., Ph.D., Professor of Industry & Technology

Anderson, Marshall (1967-2004) A.B., M.S., Associate Professor of Mathematics

Ambacher, Robert F. (1969-1998). B.A., M.A., Ph.D., Professor of Foreign Languages

Apple, John F. (1965-2002). B.S., M.S., Professor of Wellness & Sport Sciences

Bachman, Jane M. (1968-1984). A.B., M.Ed., Associate Professor of Elementary and Early Childhood Education

Barnes, Robert R. (1963-1991). A.B., M.A., Associate Professor of Economics

Beam, C. Richard (1961-1990). A.B., M.A., Professor of Foreign Languages; Director, Center for Pennsylvania German Studies

Beam, Dorothy P. (1971-1994). B.M., M.M., Associate Professor of Music

Beardslee, Edward C. (1983-2001). B.S., M.S., Ph.D., Professor of Elementary and Early Childhood Education

Benson, Geraldine (1976-2005). A.B., M.A., Assistant Professor of Librarianship

Benson, Ronald M. (1966-1997). A.B., M.A., Ph.D., Professor of History

Bimson, J. Rodney (1963-1996). B.S., M.Ed., Associate Professor of Wellness & Sport Sciences

Binkley, Isabelle H. (1958-1979). B.S., M.S., Associate Professor of Educational Media

Bird, David G. (1970-2000). B.S., M.Ed., Ph.D., Professor of Elementary and Early Childhood Education

Black, Karen L. (1991-2002). B.A., M.A., Ph.D., Professor of Foreign Languages

Blackburn, Walter W. (1971-1997). B.S., M.M., Associate Professor of Music

Blouch, Richard G. (1969-1990). B.S., M.Ed., Ed.D., Professor of Developmental Studies

Bosch, Gerald (1971-1983). A.B., M.A., Ph.D., Professor of Education

Bowers, Julia A. (1971-1991). B.S., Assistant Professor of Wellness & Sport Sciences

Boyer, Lee E. (1934-1957). A.B., Ed.M., Ed.D., Professor of Mathematics

Brandon, Anita (1978-2000). B.M., M.M., Instructor of Music (Double Reeds)

Brandon, Seymour (1976-2000). B.S., M.S., A mus. D., Professor of Music

Brown, Nicholas C. (1969-1979). B.A., M.A., Ph.D., Provost and Vice President for Academic Affairs

Brown, Robert V. (1962-1980). B.S., M.S., Ed.D., Assistant Vice President for Academic Affairs

Brye, Peter (1981-2007). B.M., M.Mu., Assistant Professor of Music

Buehler, Ruth M. (1969-2002). B.S., M.Ed., D.Ed., Professor of Special Education

Burkhardt, Gerald W. (1968-1998). A.B., M.Ed., Assistant Professor of Developmental Studies

Butler, Margaret N. (1969-1985). A.B., Instructor of English

Camirero, Rosario (1990-2006). B.A., M.A., Ph.D., Professor of Foreign Languages

Carpenter, Gene A. (1979-2001). B.A., M.A., Ed.D., Professor of Wellness & Sport Sciences; Head Football Coach

Carson, S. Kent (1966-1979). B.F.A., B.S., M.Ed., Associate Professor of Art

Casselberry, Samuel E. (1970-2004). B.A., M.A., Ph.D., Professor of Anthropology

Cassidy, Jack Wm. Jr. (1978 - 1998). A.B., M.Ed., Ph.D., Professor of Elementary and Early Childhood Education

Cavanaugh, Dorothy L. (1971-1976). B.S., Librarian

Chamberlin, David B. (1968 -1998). A.B., M.A., Assistant Professor of English

Champa, V.A. (1948-1980). A.B., M.A., Ph.D., Professor of Educational Media

Clark-Newman, Linda L. (1970-2003). B.A., Ph.D., Professor of History

Colangelo, John W. (1968-1996). B.S., M.M., Associate Professor of Music

Coley, Robert E. (1972-1999). B.A., M.A., M.S.L.S., Associate Professor of Librarianship

Cooney, Patrick. (1980-2007). B.S., M.A., Ph.D., Professor of Physics

Czap, Linus J. (1967-1997). B.S., M.A., Associate Professor of Special Education

Davis, Donald A. (1967-1979). B.S., M.F.A., Associate Professor of Art

DeCamp, Joseph E. (1967-1989). B.A., M.A., Associate Professor of Foreign Languages

DeHart, Richard C. (1956-1985). B.S., M.S., Associate Professor of Wellness & Sport Sciences

Denlinger, Charles (1964-2005). A.B., M.S., Ph.D., Professor of Mathematics

Denenberg, Dennis (1987-2002). B.A., M.Ed., D.Ed., Professor of Elementary and Early Childhood Education

Dianna, Michael A. (1969-2001). B.S., M.Ed., Ed.D., Professor of Elementary and Early Childhood Education

Dilgard, Cynthia C. (1979-2004). B.A., M.A., Ph.D., Professor of English

Dixon, Mary E. (1947-1981). B.S., M.Ed., Ed.D., Professor of Wellness & Sport Sciences

Dobbins, David. (1977-2007). A.B., M.A., Ph.D., Professor of Biology

Doering, Laura E.B., (1953-1976). B.S., M.A., Librarian

Donner, Marvin (1967-1994). A.B., Ph.D., Assistant Professor of Administrative Faculty

Dorwart, Ione L. (1959-1986). B.S., Instructor of Wellness & Sport Sciences

Doutt, Richard R. (1966-1986). B.S., M.Ed., Ed.D., Professor of Industry & Technology

Drake, Harold L. (1981-1998). B.S., M.A., Ph.D., Associate Professor of Communication & Theatre

Eidam, Donald A. (1967-2002). B.S., M.S., Associate Professor of Mathematics

Etter, Ermaleen B. (1968-1993). B.S., M.Ed., Ph.D., Professor of Special Education

Evans, June L. (1989-1999). B.A., Ph.D., Assistant Professor of Anthropology

Fanani, Dominick J. (1961-1982). B.S., M.Ed., D.Ed., Professor of Art

Finney, Betty J. (1968-2001). B.D., M.A., Ph.D., Professor of Psychology

Fischel, Jack R. (1965-2003). A.B., M.A., Ph.D., Professor of History

Fisher, Paul G. (1966-1984). B.S., M.A., M.M., Ed.D., Professor of Music

Flora, Hugo J. (1956-1982). B.S., B.F.A., M.A., Associate Professor of Industrial Arts

Foley, Denis J. Jr. (1970-1991). B.S., M.S., Ed.D., Professor of Industry & Technology

Fontes, Antone K. (1966-1985). B.S., M.S., Ph.D., Professor of Biology

Fonzi, Samuel (1966-1981). B.S., M.Ed., Associate Professor of Educational Foundations

Foreman, Stuart (1979-2005). B.S., M.Ed., Ph.D., Associate Professor of English.

Forsyth, G. Alfred (1986-2002). B.A., M.S., Ph.D., Professor of Psychology

Foster, Abram J. (1952-1979). B.S., M.A., Ph.D., Professor of History

Foster, Marion G. (1974-1984). B.A., M.S.W., D.S.W., Professor of Social Work

France, S. Richard (1969-2003). B.S., M.S., Associate Professor of Mathematics

Francis, George H. (1963-1983). B.S., M.S., Ph.D., Professor of Industrial Arts

Frerichs, Richard L. (1969-2004). B.S., M.Ed., Ph.D., Professor of Educational Foundations

Fritz, Eugene "Cy" (1968-1997). B.S., M.Ed., Assistant Professor of Wellness & Sport Sciences

Garland, Roy E. (1966-1989). B.S., M.A., Associate Professor of Mathematics

Garman, V. Scott (1966-1982). B.S., M.S., Assistant Professor of Speech

Geiger, William H., Jr. (1972-1988). B.S., M.S., Assistant Professor of Industry & Technology

Gertenbach, Donald G. (1971-1990). A.B., Ed.D., Professor of Educational Foundations

Glass, Catherine C. (1968-1996). B.S., M.L.S. Associate Professor of Librarianship

Glass, Joseph W. (1961-1990). B.S., M.S., Ph.D., Professor of Geography

Greco, Thomas W. (1976-2005). B.S., Ph.D., Professor of Chemistry

Groff, Eugene G. (1958-1982). B.S., M.Ed., Associate Professor of Education

Grosh, Joseph W. Jr. (1969-2002). B.S., M.A., Ph.D., Professor of Physics

Grubb, Luke K. (1972-1991). B.S., M.M., Associate Professor of Music

Ha, Samuel J. (1971-1998). B.A., M.S., Ph.D., Professor of Biology

Hacker, Ray K. (1966-1994). B.S., M.L.S., Associate Professor of Librarianship

Hamid, M. Khalil (1968-2002). B.S., M.A., Ph.D., Professor of Economics

Harris, Dorothy B. (1967-1996). B.Ed., M.Ed. Associate Professor of Counseling and Human Development

Harris, Harold J. Jr. (1969-2002). B.A., M.Ed., Ph.D., Professor of Counseling and Human Development

Hau, Jong Chol (1969-1997). B.E., M.B.A., Ph.D., Professor of Economics

Hauber, George D. (1970-2004). B.S., M.A., Assistant Professor of Industry & Technology

Hauck, LaVerne S. (1978-2002). B.S., M.Ed., D.Ed., Professor of Industry & Technology

Hay, Isaac (1975-2005) B.F.A., M.F.A., Professor of Art.

Heesen, Philip T. (1967-1988). A.B., M.A., Ph.D., Professor of Foreign Languages

Henderson, Alex Jr. (1955-1991). B.A., M.S., Ed.D., Professor of Biology

Hess, Richard J. (1964-1978). B.S., M.S., Ed.D., Professor of Psychology

Hibberd, John C. (1985-2004). B.A., M.A., Ed.D., Professor of Industry & Technology

Hill, Kathryn B. (1951-1968). B.S., Instructor in Wellness & Sport Sciences

Hoffman, Albert C. (1970-1999). B.S., M.S., Ph.D., Dean of Science and Mathematics

Horst, John L. (1965-1988). B.S., M.B.S., Associate Professor of Educational Foundations

Hosler, Doris K. (1968-1988). B.S., M.S.L.S., Associate Professor of Library

Hovinen, Gary (1973-2000). B.A., M.A., Ph.D., Professor of Geography

Hulme, Arthur R. (1955-1984). B.S., M.Ed., Associate Professor of Wellness & Sport Sciences

Hungerford, Nancy E. (1968-1993). B.S., M.Ed., Assistant Professor of Wellness & Sport Sciences

Hunsberger, Barbara B. (1973-2001). B.S., M.S.L.S., M.A., Associate Professor of Librarianship

Hurst, Robert M. (1978-1991). B.A., M.A., Ph.D., Associate Professor of Psychology

Hustead, Robert G. (1964-1988). B.S., M.A., Associate Professor of Art

Iglesias, Olga de C. (1966-2002). Professor of Foreign Languages

Isaak, Troy J. (1988-2004). A.B., M.Ed., Ed.D., Associate Professor of Educational Foundations

Jackson, Hazel I. (1970-1994). A.B., M.Ed., Assistant Professor of English

Jennings, Betty Ruth (1948-1963). B.S., M.A., Assistant Professor of Education

Jennings, Louis G. (1947-1980). A.B., M.A., Ph.D., Professor of English

Jolly, James A. (1966-1998). A.B., M.A., Professor of History

Jordan, William M. (1966-2000). A.B., M.A., Ph.D., Professor of Earth Sciences (Geology)

Kabacinski, Stanley (1978-2007). B.S., M.Ed., Assistant Professor of Wellness and Sports Sciences

Kahler, William V. (1969-1999). B.S., M.S., Ph.D., Professor of Wellness & Sport Sciences

Kane, Carl R. (1965-1997). B.S., M.Ed., Assistant Professor of Wellness & Sport Sciences

Kauffman, Henry J. (1942-1973). B.S., M.S., Professor of Industrial Arts

Keever, N. Catherine (1955-1974). A.B., M.A., Ph.D., Professor of Biology

Keller, Richard C. (1952-1985). B.A., M.A., Ph.D., Professor of History

Kellner, Bruce (1969-1991). B.A., M.F.A., Professor of English

Kenawell, William W. (1966-1981). A.B., M.A., Assistant Professor of History

Kent, Charles I. (1954-1977). B.S., M.S., Associate Professor

Kettering, W. Richard (1966-1994). B.S., M.Ed., Ed.D., Professor of Education Psychology

Kirchner, Audrey B. (1962-2001). B.S., M.Ed., Ph.D., Professor of Elementary and Early Childhood Education

Klinedinst, Mary A. (1986-2001). B.A., M.A., Ed.D., Ed.S., Associate Professor of Educational Foundations.

Kohr, C. Byron (1964-1981). B.A., Ph.D., Professor of Physics

Kokenes, Barbara M. (1972-1989). B.A., M.E., D.Ed., Associate Professor of Educational Foundations

Koppel, Reynold S. (1966-1994). B.A., M.A., Professor of History

Kramer, Fay (1970-2000). B.S., M.A., Assistant Professor of Educational Foundations

Kranz, Patricia L. (1971-1993). B.A., Ph.D., Professor of Psychology

Kreider, Walter Jr. (1960-1991). B.S., M.S., D.Ed., Professor of Education

Kruse, Thomas (1980-2008). B.A., M.S.W., Ph.D., Professor of Social Work

LaPierre, Douglas P. (1969-1998). B.S., M.A., Assistant Professor of Special Education

Lauderbach, Keith (1978-2007). B.S., M.A., D.Ed., Professor of Industry and Technology

Lavelle, John F. (1968-1993). B.A., M.A., D.Ed., Professor of Mathematics

Leela, Secunderabad N. (1969-1996). B.S., M.A., Ph.D., Associate Professor of Economics

Lembo, John M. (1968-2002). B.A., M.Ed., Ed.D., Professor of Psychology

Llewellyn, Mary E. (1968-1980). B.S., M.L.S., Assistant Professor of Educational Media

Long, Jacqueline (1966-1999). Licence Université de Lyon, C.A.P.E.S., Associate Professor of Foreign Languages (French)

Lord, Arthur C. (1962-1991). B.S., M.A., Associate Professor of Geography

Lotlikar, Sarojini (1971-1997). B.A., M.S.L.S. Assistant Professor of Librarianship

Love, F. Perry (1967-1996). B.S., M.Ed., Ed.D. Professor of Educational Foundations

Lowing, Robert H. (1967-2000). B.A., M.A., M.F.A., Associate Professor of Art

Lowry, Esther (1958-1967). B.S., Ed.M., Associate Professor of Education and Psychology

Lyon, Robert A. (1961-1990). A.B., B.S., M.Ed., Professor of Art

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