

**(B.S.) Information Technology
Healthcare Analytics
120 credits minimum**

Millersville University
The Management & Marketing Department
The Lombardo College of Business

CORE REQUIREMENTS (32 credits)

INTE	120	Integrated Information Technology Application Projects	4 cr	_____
INTE	130	Fundamentals of Information Technology	4 cr	_____
INTE	230	Network Concepts, Security, and Administration	4 cr	_____
INTE	240	The Fundamentals of Web Technology	4 cr	_____
INTE	360	IT Risk Management and Security	4 cr	_____
INTE	410	IT Project Management	4 cr	_____
INTE	420	Fundamentals of Operating Systems Management	4 cr	_____
INTE	440	Human-Computer Interaction	4 cr	_____

HEALTHCARE ANALYTICS OPTION (18 credits required)

INTE	255	Introduction to Data Analytics [or CSCI 452]	3 cr	_____
INTE	365	Health Care Information Management	3 cr	_____
INTE	425	Data Exploration and Visualization for IT Managers [or CSCI 453]	3 cr	_____
INTE	465	Data Analytics in Health Care	3 cr	_____
NURS	310	Health Issues from a Population Health Perspective	3 cr	_____
NURS	312	Value-Based Care	3 cr	_____

REQUIRED RELATED COURSES (20 cr) – NOTE: These courses also fulfill 4 credits of Science and Mathematics, 3 credits in the Mathematics Foundations, and 3 credits in the Social Sciences requirements.

CSCI	161	Introduction to Programming I (G2)	4 cr	_____
CSCI	162	Introduction to Programming II	4 cr	_____
CSCI	366	Database Systems	4 cr	_____
MATH	130	Elements of Statistics I (G2) [or MATH 234 (G2) or MATH 235 (G2)]	3 cr	_____
MATH	120	Logic for Information Technology	2 cr	_____
ECON	102	Principles of Microeconomics (G3)	3 cr	_____

RECOMMENDED COURSES

BUAD	251	Organization and Management (G3, W)	3 cr	_____
COMM	335	Communications and Emerging Technologies (G1, W)	3 cr	_____
ECON	101	Principles of Macroeconomics (G3)	3 cr	_____
MATH	151	Calculus for the Management, Life and Social Sciences (G2)	4 cr	_____

GENERAL EDUCATION (48 credits minimum – Note: 10 credits of Gen Ed are fulfilled by Required Related courses)

<p>G1: HUMANITIES & FINE ARTS (9 cr) ART, COMM/THEATRE, ENGL, FOREIGN LANG/HUMN, MUSIC, PHIL</p> <p>(1) _____ 3 cr __</p> <p>(2) _____ 3 cr __</p> <p>(3) _____ 3 cr __</p> <p>G2: SCIENCE & MATH (9 cr) NOTE: These 9 credits are fulfilled by the Required Related Science and Math Courses</p> <p>(1) CSCI 161 _____ 4 cr __</p> <p>(2) Natural Science _____ 3 cr __</p> <p>(3) Natural Science with Lab _____ 4 cr __</p> <p>G3: SOCIAL SCIENCES (9 cr) AFAM, ANTH, BUAD, ECON, GEOG, GOVT, HIST, INTL, PSYC, SOCY, SOWK/GERT, WSTU</p> <p>(1) ECON 102 _____ 3 cr __</p> <p>(2) _____ 3 cr __</p> <p>(3) _____ 3 cr __</p> <p><i>For G1, G2, and G3: Max. of 2 courses from the same dept.; all 3 could be from different depts.</i></p>	<ul style="list-style-type: none"> • COMM 100 Fund. of Speech (<i>minimum of "C-" required</i>) 3 cr • ENGL 110 Engl Composition (<i>minimum of "C-" required</i>) 3 cr • MATH Foundations (<i>fulfilled by MATH 130</i>) • Advanced Writing (fulfilled by ENGL 316 Business Writing 3 cr; other possibilities include ENGL 312 Tech. Writing or ENGL 319 Science Writing 3 cr) • Perspectives [P] 3 cr • WELL 175 3 cr • UNIV 103 First Yr Inquiry or Open Elective 3 cr ◆ <i>Open Elective cannot be a course from major department</i> <p>General Education Requirements Checklist:</p> <p><i>Three G1, G2, or G3 courses at 200-level or higher:</i></p> <p><i>Three Writing courses (does <u>not</u> include ENGL 312/316/319)</i></p> <p><i>One Cultural Diversity [D] Course _____</i></p> <p><i>Free Electives _____ cr _____</i></p>
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Academic Map

Include an **Academic Map** that outlines the course sequence as appropriate for full-time students, and if applicable, a course sequence if designed as degree completion for non-traditional students. An example of an Academic Map for a baccalaureate program is included below:

Bachelor of Science in Information Technology (Healthcare Analytics Option) Sample Academic Map

A Suggested Sequence of Required Courses

Freshman Year

<u>Fall</u>			<u>Spring</u>		
_____	3	ENGL 110	_____	3	COMM 100
_____	4	INTE 120	_____	4	INTE 130
_____	2	MATH 120	_____	3	MATH 130 (Foundations)
_____	3	UNIV 103	_____	4	CSCI 161 (G2)
_____	3	WELL 175			
Total	15		Total	14	

Sophomore Year

<u>Fall</u>			<u>Spring</u>		
_____	4	INTE 230	_____	4	INTE 240
_____	4	CSCI 162	_____	3	INTE 255
_____	4	G2 Natural Science with Lab	_____	4	CSCI 366
_____	3	ECON 102 (G3)	_____	3	G1 (200 level, W)
Total	15		Total	14	

Junior Year

<u>Fall</u>			<u>Spring</u>		
_____	3	NURS 310	_____	3	NURS 312
_____	4	G3 (e.g., ECON 101)	_____	4	INTE 360
_____	3	G2 Natural Science	_____	3	INTE 365
_____	3	Cultural Diversity	_____	3	G1
_____	3	G1 (200 level, W)	_____	3	ENGL (e.g., 316) Advanced Writing
Total	16		Total	16	

Senior Year

<u>Fall</u>			<u>Spring</u>		
_____	4	INTE 410	_____	4	INTE 440
_____	4	INTE 420	_____	3	INTE 465
_____	3	INTE 425	_____	3	Free Elective
_____	3	G3 (200 level, W)	_____	3	Free Elective
			_____	3	Perspectives
Total	14		Total	16	



Course Offerings

Please list the course prefix, number, and catalog description for all major and elective courses. Indicate which courses are new to support this proposed program.

Since this is a new program, courses would need to be developed. Below are tentative titles and course descriptions for Information Technology courses. An outline of proposed topics for the majority of core courses has also been developed.

INFORMATION TECHNOLOGY COURSES (new; titles and descriptions)

INTE 120 Integrated Information Technology Application Projects (4 cr)

Introduction to the use of information technology to retrieve, filter, process, classify, sort, and evaluate data and information in a business environment. Developing word processing, spreadsheets, database, scripting, and presentation skills to create integrated projects for business and workplace environments.

INTE 130 Fundamentals of Information Technology (4 cr)

This course provides students with a working knowledge of the terminology, processes, and components associated with information technology. Students will be introduced to the creation, organization, analysis, storage, retrieval, representation, and transmission of data and information as well as work force considerations, and related societal and ethical issues with respect to IT.

INTE 230 Network Concepts, Security, and Administration (4 cr)

An introduction to computer network concepts that includes fundamental protocols and administration. Computer network communications will be discussed including LAN and WAN topologies, protocols and services, such as TCP/IP, and Ethernet, within the context of the OSI Reference Model, multimedia, and content distribution networks. Topics in network management will also be covered, including users/groups, file permissions, system maintenance, and trouble shooting. Network management, packet analyzer, and network simulation tools may be used. Prerequisite: CSCI 161; INTE 130

INTE 240 Fundamentals of Web Technology (4 cr)

Introduction to web-based information systems that includes the principles and practices of website design, website implementation, and evaluation of web-based applications including related software, databases, interfaces, and platforms. The importance of design, usability, and accessibility of website design strategies will be covered. Security and privacy issues related to web-based information systems are also explored. Prerequisites: CSCI 161; INTE 130.

INTE 360 IT Risk Management and Security (4 cr)

Explores Networking Security from the perspective of risk management to develop strategies to mitigate and manage risks. Focuses on assessment strategies for effective mitigation measures



and risk management practices in terms of cybersecurity. Risk Management Fundamentals and Managing Risks as Threats, Vulnerabilities, and Exploits will be covered and methods on how they are applied in cybersecurity decisions will be investigated. Prerequisite: INTE 230

INTE 410 IT Project Management (4 cr)

This course covers technical and behavioral aspects of the successful management of information systems developments. Topics include needs identification, system project manager and team, system project organizations, project communications, system project planning, scheduling, control, associated costs, and using project management software tools. Examples of IT project management process will be explored for different industry lines with respect to system development activities and System Development Life Cycle. Corequisite: INTE 360

INTE 420 Fundamentals of Operating Systems Management (4 cr)

This is an introduction to the foundational principles of operating systems. Topics include system management in memory, processor, process and thread mechanics, devices, network, file and directory, graphical and command line user interfaces. Essentials for effective administration and maintenance of an operating system and its services will be discussed. In addition, students will learn to install, manage, and secure an operating system. Prerequisites: CSCI 162; INTE 230

INTE 440 Human-Computer Interaction (4 cr)

This course studies the effective and productive information systems, including interactive computer systems, input and output devices, screen layouts, machine design, health issues, organizational impacts, and access for people with disabilities. Topics include interaction system design, conceptualizing interaction, cognitive aspect of users, social interaction, emotional interaction with systems, and interfaces. The process of designing user-friendly interfaces will be discussed including data gathering, data analysis, interpretation, and presentation. Prerequisite: INTE 410 or CSCI 362

HEALTHCARE ANALYTICS OPTION ELECTIVES (new; tentative titles and descriptions)

INTE 255 Introduction to Data Analytics (3 cr)

Introduction to data analysis techniques and programming that enables real-time decision making in IT organizations. Includes skills and applications in pre-processing, preparing, and reporting data for further analysis. Prerequisite: MATH 130 or MATH 234 or MATH 235 (Note: to be cross-listed with MATH 255)

INTE 365 Information Technology in Health Care (3 cr)

Students will apply fundamental skills in information technology to database design, data structures, software applications, and their management functions in health services organizations. Techniques in database design and management in the health care system will be discussed. Prerequisite: CSCI 366; Prerequisite or Corequisite: NURS 310; NURS 312



INTE 425 Data Exploration and Visualization for IT Managers (3 cr)

Students will learn dataset elements, data collection, representation and querying techniques, visual variables and statistical tools for graphing, and preparation of data for further analysis, with emphasis on issues related to healthcare. Students will also be introduced to data science tools and related coding techniques. Prerequisites: INTE 255; CSCI 366

INTE 465 Data Analytics in Health Care (3 cr)

An introduction into the uses of data analytics in population health practices and their administration. Students will explore the development of validated predictive analytics and their application in clinical interventions. The intersection of data analytics with ethics will also be discussed. Prerequisites: INTE 255; INTE 365

NURS 310 Health Issues from a Population Health Perspective (3 cr)

The essentials of population health practices will be discussed along with how they are used by different groups to assess health outcomes and make recommendations to improve access to care and quality of care while reducing the cost of care.

NURS 312 Value-Based Care (3 cr)

The healthcare industry is shifting to value-based and risk-based reimbursement and it is a monumental change that is impacting every component of healthcare. Healthcare is focused on high-value, cost-effective, and evidence-based measures that incorporate innovation, resource stewardship, and systems thinking. Under new payment models, reimbursement is tied directly to clinical, organizational, and consumer outcomes. It is, therefore, critical that all involved in healthcare are aware and can apply the principles associated with value-based care to their respective roles.

COMMON ELECTIVE COURSES (new; tentative titles and descriptions)

INTE 300 Internship (1-6 cr)

Entry-level cooperative education or internship experience.

INTE 400 Internship (1-6 cr)

Cooperative education or internship assignment with increased responsibility over the INTE 300 level.

INTE 486 Topics in Information Technology (1-4 cr)

Topics Course.

INTE 489, 499 Honors Courses/Thesis (1-4 cr)

For the definition of honors course/thesis and eligibility, refer to the *Special Academic Opportunities* section of this catalog.



INTE 498 Independent Study in Information Technology (1-4 cr)

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 information technology. A written report is required. Prerequisite: departmental permission.

POTENTIAL ELECTIVE COURSES**INTE 350 Cybersecurity (4 cr)**

Investigate vulnerability of computer networks, systems, and computer applications. Learn methods of mitigation and/or prevention of cybercrime. Attributes of cybercrime such as virus attacks, identity theft, electronic funds transfers, and phishing will be examined along with an introduction to the cybersecurity script programming paradigm. Prerequisites: INTE 230

INTE 435 IT Security, Privacy, and Ethics (W) (3 cr)

Examination of information technology security and privacy issues in the context of law and ethics. This course explores the civil and common law issues that apply to information technology. The course studies jurisdictional, statutes, and constitutional issues related to cybercrime and privacy issues in the information age. Prerequisites: ENGL 110; INTE 230; ENGL 316 recommended

REQUIRED RELATED MATH & SCIENCE COURSES (existing)**CSCI 161 Introduction to Programming I (G2) (4 cr)**

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. Prerequisite: placement in MATH 160 or higher.

CSCI 162 Introduction to Programming II (G2) (4 cr)

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. Prerequisite: C or higher in CSCI 161.

CSCI 366 Database Systems (4 cr)

Introduction to building database-driven applications. Topics include data modeling, building databases, database queries, basic data management, Model View Controller design paradigm, basic database-driven application development, and non-relational database systems. Prerequisite: C- or higher in CSCI 162; C- or higher in CSCI 140 or MATH 140.



MATH 120 Logic for Information Technology (2 cr)

Discrete mathematics and its applications to technology including formal mathematical notation, propositional logic, predicate logic, set theory, relations, functions, and matrices. No credit toward a math or four-year computer science major. Prerequisite: MATH 101 or equivalent with a grade of C- or higher, or math placement testing/evaluation before registration.

MATH 130 Elements of Statistics (G2) (3 cr)

Derivation of basic formulas; measures of central tendency and variability; probability and normal curve; sampling and hypothesis testing. Prerequisite: A 100 level math course or math placement

ECON 102 Principles of Microeconomics (G3) (3 cr)

Introduction to microeconomic analysis concentrating on consumer and producer behavior, competitive and other markets, public policy and government regulation.

