



This section of the catalog provides the programs of study required to complete certificates offered through the College of Arts and Sciences, the Francis College of Engineering and the School of Health and Environment.

Students complete the certificate programs at their own pace, usually enrolling in one or two courses each semester. Courses may be taken during the Fall, Spring, Summer or Winter Intersession semesters. Although students have some flexibility in scheduling courses, they should adhere to the appropriate course prerequisites.

certificate programs

Admissions, Transfer Information and
Program Requirements

Certificates

Computer Assisted Manufacturing
Computer Engineering Technology
Contemporary Communications
Database Management Technologies
Data/Telecommunications
Electronics Technology
Graphic Design & Digital Imaging
Information Technology
Land Surveying
Manufacturing Technology
Multimedia Applications
Nutrition
Paralegal Studies
Plastics Engineering Technology
Security Management & Homeland
Security
Spanish and Latin American Studies
Technical Writing
UNIX
Wastewater Treatment
Water Treatment
Website Design & Development

A Step-by-Step Guide to Pursuing a Certificate Part-time at UMass Lowell

REQUIRED:

- ☆ Select your desired certificate program and complete the certificate program application for admission. To view a complete list of certificates Continuing Studies offers on a part-time, evening basis, visit <http://continuinged.uml.edu/certificates/index.htm>
- ☆ Fax the application to (978) 934-3086 or mail the application to:
University of Massachusetts Lowell
Admissions/Continuing Studies, Corporate and Distance Education
Dugan Hall, Room 110
883 Broadway Street
Lowell MA 01854-5104
- ☆ Contact the high school or college where you most recently took courses and ask them to send out official transcripts directly to the UMass Lowell Admissions Office at the address above.
- ☆ International students must have their transcripts evaluated by the Center for Educational Documentation. (<http://www.cedevaluations.com>)
- ☆ Register for courses
- ☆ Once your application and transcripts have been received, you will receive a confirmation letter from Continuing Studies.

RECOMMENDED:

- ☆ Attend a Continuing Studies Open House/Orientation.
- ☆ Speak with a Program Coordinator or Student Support Specialist to review certificate requirements (<http://continuinged.uml.edu/general/advising.htm>).
- ☆ If you're a veteran, senior citizen or your employer provides tuition assistance, check your eligibility for tuition waivers/remission.
- ☆ Become familiar with University policies and regulations in our catalog.
- ☆ Contact the Continuing Studies Faculty and Student Support Center with any questions at (978) 934-2474, email Continuing_Education@uml.edu or drop by Southwick Hall Room 202 on UML North, Monday through Thursday from 8:30am to 8:00pm and on Friday from 8:30am to 5:00pm.

Certificate Programs: Admissions, Transfer Information and Program Requirements

CERTIFICATE PROGRAMS

UMass Lowell offers a wide variety of credit certificate programs that allow students to obtain marketable skills within a concentrated time frame. These short-term certificate programs consist of a series of courses which, when taken together, demonstrate expertise in a specific area. A wide range of certificate programs are available online - see <http://continuinged.uml.edu/online> for details.

These certificate programs have been developed through extensive research, and the curricula are reviewed and approved by an advisory board of experts. In most cases, certificate program courses may be applied to a related degree program. To remain abreast of rapidly changing technology, we continuously update these programs to ensure that our students have an opportunity to develop skills that are in high demand in the workplace. Check our website for the most up-to-date information on all of our programs and courses: <http://continuinged.uml.edu>.

Admissions into Certificate Programs

Students are welcome to take certificate program courses on an individual basis, but must formally apply into the certificate program and complete all of the required courses and electives with a "C" or better in order to receive the certificate. To be considered for acceptance into a certificate program, students must hold a high school diploma or GED.

Transfer Information for Certificate Programs

Only one course may be transferred from another institution of higher education into an undergraduate certificate program. Official transcripts must be sent directly from the transferring institution to the Division of Continuing Studies. Credit will be accepted if it is equivalent to University of Massachusetts Lowell instruction, if it is applicable to the intended program, and if the student has received a grade equivalent to a "C-" (1.700 on a 4.00 scale) or better.

General Requirements for Certificates

All certificate candidates are required to earn a 2.00 ("C") cumulative average in their total course of study, to complete the requisite number of course credits, to conform to the general regulations and requirements of the University, and to satisfy the regulations and academic standards of the colleges that exercise jurisdiction over the certificates for which they are matriculating.

Certificate Completion

After successful completion of all certificate requirements, including a grade point average of 2.00, a student should submit to the Division of Continuing Studies an exit survey and a completed "Petition for the Awarding of a Certificate" form, which is available at <http://continuinged.uml.edu/certificates/certificatecompletion.htm>. The petition should be accompanied by an official high school transcript or GED and a college transcript if the student is planning to transfer a course. Upon verification of documentation and within 4-6 weeks, the student will be mailed the certificate by U.S. first-class mail. The receipt of the certificate will be noted formally on the student's transcript with an award date of October, February or June.

CERTIFICATE IN CONTEMPORARY COMMUNICATIONS

Available on campus or online

The Contemporary Communications Certificate is intended as an introductory certificate to prepare students for work in a rapidly changing, information-driven workplace. Students will develop skills in research, analysis, writing, graphic presentation of material, and the use of technology as a tool for communication.

This certificate program is interdisciplinary and draws upon the expertise and knowledge of several departments within the University. Many of the courses in this certificate can also be applied towards several other certificates and degrees offered by UMass Lowell.

REQUIRED COURSES (4 plus 2 electives)

Written Communication - Choose 1:

- 42.221 Writing for Interactive Media
- 42.224 Business Writing
- 42.226 Technical and Scientific Communication
- 42.300 Journalism

Computer-Based Communications - Choose 1:

- 90.160 Introduction to Information Systems
- 90.238 Website Development: Microsoft® Expression® Web
- 90.291 Introduction to DHTML
- 91.113 Exploring the Internet

Strategic Thinking and Effective Communication - Choose 1:

- 45.202 Introduction to Logic
- 46.210 Media and Politics
- 62.201 Marketing Principles
- 90.250 E-Commerce on the Web
- 90.460 Computer Ethics

Multimedia/Graphic Design and Development - Choose 1:

- 70.291 Introduction to Graphic Design
- 90.230 Introduction to Multimedia
- 90.231 Graphics for Multimedia and the World Wide Web
- 90.232 Desktop Video Production

ELECTIVES (Choose 2 not already taken)

- 42.221 Writing for Interactive Media
- 42.224 Business Writing
- 42.226 Technical and Scientific Communication
- 42.300 Journalism
- 45.202 Introduction to Logic
- 45.205 Argumentation and Rhetoric
- 45.207 Corporate Communications
- 45.356 The History, Theory, and Practice of Rhetoric
- 46.210 Media and Politics
- 46.316 Politics and Film
- 62.201 Marketing Principles
- 70.291 Introduction to Graphic Design
- 90.160 Introduction to Information Systems
- 90.230 Introduction to Multimedia
- 90.231 Graphics for Multimedia and the World Wide Web
- 90.232 Desktop Video Production
- 90.238 Website Development: Microsoft® Expression® Web
- 90.250 E-Commerce on the Web
- 90.291 Introduction to DHTML
- 90.460 Computer Ethics
- 91.113 Exploring the Internet

CERTIFICATE IN GRAPHIC DESIGN AND DIGITAL IMAGING

Over the past decade the graphics industry has moved from predominantly design-for-print to an overwhelming mix of design-for-print, interactive design for CD-ROM and design for the World Wide Web. To succeed in this constantly changing field, graphics professionals need more than a strong foundation in graphic design principles – they need the technical know-how to incorporate their designs into today's media. This certificate program offers students an innovative mix of traditional design courses along with courses in multimedia, website development, desktop publishing and more. Students complete numerous design projects for their portfolios, and get hands-on experience using software such as QuarkXPress®, Adobe InDesign®, Photoshop® and others. Many of the courses in this program may also be applied towards the certificates in Multimedia Applications and Website Design & Development: Design Track.

REQUIRED COURSES (6)

- 70.291 Introduction to Graphic Design
- 70.240 Fundamentals of Typography
- 70.245 Desktop Publishing: Layout and Production
- 70.262 Digital Imaging and Photography: Photoshop®
- 70.391 Advanced Graphic Design
- 70.400 Portfolio Production Seminar

ELECTIVES (CHOOSE 3)

- 70.264 Computer Graphics & Illustration
- 70.362 Advanced Digital Imaging
- 70.376 3D Computer Animation
- 70.377 Advanced Animation: After Effects
- 70.379 Website Design: Dreamweaver®
- 70.384 Advanced Website Design & Development
- 70.392 Design for Advertising
- 90.230 Introduction to Multimedia
- 90.231 Graphics for Multimedia and the World Wide Web
- 90.238 Website Development: Microsoft® Expression® Web
- 90.247 Web Authoring: Adobe® Flash®

Note: 70.245 Desktop Publishing usually features either QuarkXPress or InDesign. Refer to the semester course bulletin or website to see which will be covered in the current semester.

CERTIFICATE IN TECHNICAL WRITING

Those with strong writing skills and an aptitude for computers are encouraged to enter this program. Taught by practicing professionals from the high tech industry, students learn to use the most current technologies and processes. Students enrolled in this certificate program can apply for scholarships sponsored by the Society for Technical Communication.

REQUIRED COURSES (4)

- 42.408 Principles of Technical Writing
- 42.412 Software Writing
- 42.413 Advanced Software Writing
- 90.306 Introduction to XML

ELECTIVES (CHOOSE 2)*

- 42.221 Writing for Interactive Media
- 90.227 Developing Interactive Help Systems
- 90.228 Introduction to Adobe® FrameMaker
- 90.291 Introduction to DHTML

*Note: This is a partial list of elective courses. For a complete list of courses that may be applied as electives to this program, check our online course listings for computer courses with a 90.- - - prefix. For assistance with your course selection, please contact the Faculty and Student Support Center at (978) 934-2474.

CERTIFICATE IN MULTIMEDIA APPLICATIONS

Available on campus or online

Recent advances in digital technology and fiber optics have revolutionized the way we live and learn. Multimedia is used today in movies, education, entertainment, marketing, advertising, information services, teleconferencing, publishing, interactive television and product demonstration. With the rapid transfer of information and the growing need to present this information in a powerful way, individuals with the skills and knowledge to communicate effectively will flourish in the multimedia industry.

The Multimedia Certificate Program at UMass Lowell is interdisciplinary and draws upon the expertise and knowledge of several departments, colleges and centers within the University, as well as outside expertise from industry professionals.

You can now earn the Certificate in Multimedia Applications on campus or online! Fueled by popular demand and funded in part by a grant from the prestigious Alfred P. Sloan Foundation, the University of Massachusetts Lowell is pleased to announce the migration of its premier Multimedia Certificate Program to an online format.

REQUIRED COURSES (4)

- 90.230 Introduction to Multimedia
- 90.231 Graphics for Multimedia and the World Wide Web
- 90.232 Desktop Video Production
- 90.247 Web Authoring: Adobe® Flash®

ELECTIVES (CHOOSE 2)

- 42.221 Writing for Interactive Media
- 70.262 Digital Imaging and Photography: Photoshop®
- 70.264 Computer Graphics and Illustration
- 70.291 Introduction to Graphic Design
- 70.376 3D Computer Animation
- 70.377 Advanced Animation: After Effects
- 70.379 Website Design: Dreamweaver®
- 70.384 Advanced Website Design and Development
- 70.385 Streaming Media for the Web
- 78.201 Introduction to Audio for Multimedia and the WWW
- 90.227 Developing Interactive Help Systems: Macromedia RoboHelp
- 90.236 Instructional Design for Interactive Media
- 90.238 Website Development: Microsoft Expression Web
- 90.239 Multimedia Scripting Using Macromedia Director's Lingo
- 90.249 Developing IT Training for the Web
- 90.250 E-Commerce on the Web
- 90.291 Introduction to DHTML
- 90.306 Introduction to XML
- 90.347 Rich Web Development with Flash (Advanced)
- 90.348 Developing Dynamic Websites with ColdFusion

CERTIFICATE IN WEBSITE DESIGN AND DEVELOPMENT

Available on campus or online

In our rapidly-evolving, knowledge-based economy, workers are struggling to keep up with the latest technologies and skills. Specifically, in the area of Internet technology, local companies are actively pursuing employees with knowledge and skills in website design and development.

Note: Students participating in this program should have basic computer proficiency. Please refer to the current semester course listings to see whether a course is offered in a PC or MAC lab, or online.

WEB DESIGN TRACK

Note: Students pursuing this track should have basic familiarity with HTML. Those who do not have basic familiarity with HTML are encouraged to take 90.291 Intro to DHTML as one of their electives prior to taking the required courses in this track.

REQUIRED COURSES (4)

- 90.231 Graphics for Multimedia and the World Wide Web
- 70.379 Website Design: Dreamweaver®
- 90.247 Web Authoring: Adobe® Flash®
- 70.384 Advanced Website Design and Development

ELECTIVES (CHOOSE 2)

- 70.262 Digital Imaging and Photography: Photoshop®
- 70.385 Streaming Media for the Web
- 78.201 Introduction to Audio for Multimedia and the WWW
- 90.230 Introduction to Multimedia
- 90.238 Website Development: Microsoft® Expression® Web
- 90.248 Website Database Implementation
- 90.250 E-Commerce on the Web
- 90.291 Introduction to DHTML
- 90.292 Advanced DHTML
- 90.302 JavaScript
- 90.306 Introduction to XML
- 90.347 Rich Web Development with Flash® (Advanced)
- 90.348 Developing Dynamic Websites with ColdFusion

WEB DEVELOPMENT TRACK

REQUIRED COURSES (4)

- 90.291 Introduction to DHTML
- 90.238 Website Development: Microsoft® Expression® Web
- 90.248 Website Database Implementation
- 90.306 Introduction to XML

ELECTIVES (CHOOSE 2)

- 70.379 Website Design
- 70.384 Advanced Website Design and Development
- 70.385 Streaming Media for the Web
- 78.201 Introduction to Audio for Multimedia and the WWW
- 90.227 Developing Interactive Help Systems
- 90.245 Website Server Administration
- 90.246 Active Server Pages .NET
- 90.247 Web Authoring: Adobe® Flash®
- 90.249 Developing IT Training for the Web
- 90.250 E-Commerce on the Web
- 90.292 Advanced DHTML
- 90.301 Java Programming
- 90.302 JavaScript
- 90.305 Introduction to Perl
- 90.347 Rich Web Development with Flash (Advanced)
- 90.348 Developing Dynamic Websites with ColdFusion

*Note: Other 90.-.- courses may be substituted as electives for the Web Development Track with prior approval from the certificate program coordinator.

CERTIFICATE IN INFORMATION TECHNOLOGY

Available on campus or online

The need for professionals with a strong information technology background will continue to increase as business, government, schools and other organizations seek new applications for computers and networks in the workplace. This certificate is designed as an introductory program for those who want to explore a broad range of electives in different information technology subject areas before deciding on an area of specialization. This program will serve as a gateway to the other, more specialized certificate programs in information technology.

You can earn the Certificate in Fundamentals of Information Technology entirely online, on campus or by taking a combination of online and on campus courses. For more details, please see our website at <http://continuinged.uml.edu/online>.

REQUIRED COURSES (2)

- 90.160 Introduction to Information Systems
- 90.202 Microsoft® Office*

ELECTIVES (CHOOSE 4)**

Programming Electives

- 90.211 Introduction to Programming with C, Part I
- 90.212 Introduction to Programming with C, Part II
- 90.220 Visual Basic
- 90.267 C Programming
- 90.268 C++ Programming
- 90.269 Advanced C++
- 90.270 Visual C++
- 90.364 Problem Solving with C

Database Electives

- 90.171 Applications Software: Microsoft® Access
- 90.342 Web-Enabled Database Development
- 90.474 Relational Database Concepts

Multimedia/Web Electives

- 90.230 Introduction to Multimedia
- 91.113 Exploring the Internet

Additional Electives

- 90.311 Introduction to the UNIX Operating System
- 90.312 Shell Scripting
- 90.461 LAN/WAN Technologies

*Students with spreadsheet and database experience can replace the required courses with any of the elective courses.

**Note: This is a partial list of computer elective courses. For the complete list of courses that may be applied as electives to this program, see the current Continuing Studies Course Bulletin for computer courses with the 90.- - - prefix, or contact the Faculty and Student Support Center at (978) 934-2474.

CERTIFICATE IN UNIX

Available on campus or online

More than 300,000 UNIX installations worldwide support over a million users. In comparison with other existing operating systems, UNIX offers more flexibility and a greater set of comprehensive services. Its powerful features permit many users to use one system, and the multitasking capacity allows users to perform several processes at the same time. Its support of open systems architecture and its unique multitasking features have made UNIX one of the most popular operating systems today.

The Certificate Program in UNIX is designed for those currently in the computer industry who want to upgrade their skills, and for those with basic computer literacy who want to enter this fast-growing field. The program curriculum combines theory and practical applications. Students learn skills that are immediately applicable in the workplace as well as C Programming, the language in which most networking software is written.

Many of the courses in the UNIX Certificate Program may be used to satisfy requirements in the Information Technology and Data/Telecommunications Certificate Programs, as well as the A.S. or B.S. Degrees in Information Technology. Note: The UNIX Certificate is available in accelerated and online formats. See the UMass Lowell website at <http://continuinged.uml.edu/online> for more information.

REQUIRED COURSES (4)

- 90.267 C Programming
- 90.311 Introduction to the UNIX Operating System
- 90.312 Shell Scripting
- 90.360 Introduction to Data Structures

ELECTIVES (CHOOSE 2)

- 90.268 C++ Programming
- 90.269 Advanced C++
- 90.313 UNIX Internals Overview
- 90.316 UNIX System Administration
- 90.318 Advanced UNIX Internals/Tuning
- 90.319 Introduction to Linux
- 90.321 Linux System Administration

CERTIFICATE IN DATABASE MANAGEMENT TECHNOLOGIES

New! Oracle 10g Courses-

The Database Management Technologies Certificate program, as part of Oracle Corporation's Academic Initiative (OAI), prepares students for the requirements and rigors of becoming an in-demand Database Administrator or Developer. Centered on the industry-leading Oracle 10g/11i™ product suite, students engage in a progressive learning experience. Hands-on skill building throughout the program will prepare students for challenging and highly rewarding positions in today's data-driven industry. In addition to preparing for Oracle Professional Certification, students may apply all courses towards a degree in Information Technology. Whether pursuing an academic degree, a certificate or both, our Oracle-certified faculty will help students gain valuable technical skills as a marketable enhancement to their overall academic program of study. Students choose three electives from either the Developer or Administrator Tracks, depending upon their specific area of interest.

REQUIRED COURSES (4)

- 90.450 Database Administration I: Introduction to Oracle 10g
 - 90.453 Database Administration II: Advanced Oracle 10g
 - 90.454 Oracle 10g SQL Development
 - 90.459 PL/SQL I: Introduction to Oracle 10g PL/SQL
- Note: Students with experience equivalent to any of the required courses may substitute up to two electives for the required courses, with prior approval of the program coordinator.

CHOOSE 3 ELECTIVES FROM EITHER OF THE FOLLOWING TWO TRACKS:*

DEVELOPER TRACK ELECTIVES (CHOOSE 3)

- 90.448 Oracle 10g Portal Development
- 90.449 Oracle 10g Forms and Reports
- 90.467 PL/SQL II: Advanced Oracle 10g PL/SQL
- 90.474 Relational Database Concepts

ADMINISTRATOR TRACK ELECTIVES (CHOOSE 3)

- 90.443 Introduction to Client/Server Computing
- 90.455 Database Administration III: Oracle 10g Projects
- 90.466 Oracle 10g Data Warehousing
- 90.479 Oracle 11i Applications DBA

*Note: If you would like to, you may choose one elective course from one of the tracks and two elective courses from the other track, as long as you take a total of three elective courses in addition to the required courses above.

CERTIFICATE IN DATA/TELECOMMUNICATIONS

Available on campus or online

The Certificate Program in Data/Telecommunications trains participants for positions as entry-level network administrators, LAN technicians and system analysts responsible for networking functions in large or small companies. Many of the courses in this certificate program can be applied towards the A.S. or B.S. Degree in Information Technology.

REQUIRED COURSES (5)

- 90.267 C Programming
- 90.461 LAN/WAN Technologies
- 90.462 TCP/IP and Network Architecture
- 90.457 Network Security
- 90.464 Network Management

CERTIFICATE IN SECURITY MANAGEMENT AND HOMELAND SECURITY

Available online*

Since September 11th, the U.S. Department of Labor has been predicting that the employment of security management personnel will grow faster than all other occupations due to the threat of terrorism. The Certificate Program in Security Management and Homeland Security, offered under the auspices of the Criminal Justice Department in concert with Continuing Studies, Corporate and Distance Education, is designed for personnel working in the areas of public safety, security management and law enforcement; executives in corporations responsible for overseeing in-house security programs; and information technology professionals. Criminal justice students interested in enhancing their future career prospects may also benefit from this program by broadening their studies to encompass security within private industry.

All courses can be applied toward UMass Lowell's part-time Bachelor's Degree in Criminal Justice.

REQUIRED COURSES (4)

- 44.115 Introduction to Homeland Security
- 44.241 Physical Security
- 44.312 Security Management
- 90.385 Introduction to Information Security (Cyber Security)

ELECTIVES (CHOOSE 2)

- 44.212 Weapons of Mass Destruction
- 44.234 Criminal Law
- 44.248 Terrorism
- 44.326 Domestic Terrorism and Hate Crimes
- 44.342 Criminal Profiling
- 44.343 Forensic Psychology
- 44.380 Selected Issues in Criminal Justice

**Note: Some of these courses are also offered on campus. See our current course listings on our website for a list of available on campus courses.*

CERTIFICATE IN PARALEGAL STUDIES

Available on campus or online

The Certificate Program in Paralegal Studies offers a unique mix of legal theory and practical skills applications. One special feature of specific interest in the program is the Paralegal Practicum, which can provide students with real-world experience in research, drafting, ethics and client interaction. All of the courses in the certificate program may be applied to the B.S. Degree in Criminal Justice, Paralegal Option.

REQUIRED COURSES (4)

- 41.103 Introduction to Paralegal Studies
- 41.370 Real Estate Law
- 41.387 Legal Research Methods
- 41.390 Litigation

ELECTIVES (CHOOSE 2)

- 41.363 Corporate and Property Law
- 41.367 Environmental Law
- 41.376 Family Law
- 41.381 Women and the Law
- 41.392 Wills, Trusts, and Estates
- 41.497 The Paralegal Practicum

CERTIFICATE IN SPANISH AND LATIN AMERICAN STUDIES

The Certificate in Spanish and Latin American Studies offers proficiency in the Spanish language as well as exposure to the literature and culture of Latin America and Spain. It is valuable to language teachers seeking additional language certification in Spanish, as well as to engineers, consultants, business people and others for whom language proficiency and cultural information are crucial for successful business operations in Spanish-speaking countries and the United States.

REQUIRED COURSES (2)

- 54.211 Intermediate Conversational Spanish I or equivalent
- 54.212 Intermediate Spanish II and Culture or equivalent

ELECTIVES (CHOOSE 4)

- 54.310 Spanish Civilization and Culture
- 54.313 Fieldwork in the Spanish Community*
- 54.315 Latin American Civilization and Culture
- 54.320 Special Topics in Spanish Studies*
- 54.335 Spanish Women Writers
- 54.401 Selected Authors*
- 54.412 Short Story in Latin America

*Course may be repeated

CERTIFICATE IN NUTRITION

With the focus on health, fitness and disease prevention, this certificate is designed to expand knowledge related to the body's handling of nutrients and to enable students of other disciplines to relate this knowledge to their specific fields.

The Certificate Program in Nutrition serves four distinct audiences: 1) students in UMass Lowell's School of Health and Environment who are not eligible to obtain a minor in a related field, 2) students with Associate's Degrees in science or clinical areas, 3) students in science-related Bachelor's Degree programs seeking employment opportunities in health-related industries and community-based programs, and 4) individuals with no previous experience who would like to use the certificate as a stepping stone towards a formal degree in nutrition, dietetics or nutritional sciences.

REQUIRED COURSES (4)

- 35.206 Human Nutrition
- 35.207 Fitness and Nutrition OR 36.372 Obesity and Weight Control
- 36.371 Advanced Human Nutrition
- 36.481 Clinical Nutrition

ELECTIVES (CHOOSE 1)

- 35.207 Fitness and Nutrition OR 36.372 Obesity and Weight Control
- 36.350 Human Biochemistry
- 36.406 Biochemistry of Lipids
- 36.463 Vitamins & Minerals
- 36.472 Nutrition & Gene Expression

CERTIFICATE IN COMPUTER-ASSISTED MANUFACTURING

Available on campus or online

The Certificate Program in Computer Assisted Manufacturing is designed for those who have basic drawing experience and who want to expand their knowledge in the latest industry-standard CAD software applications that are in use today. The courses in this certificate program may also be applied towards UMass Lowell's Bachelor's Degree in Mechanical Engineering Technology.

Note: Students who do not have drawing experience must take 23.101 Engineering Graphics (not currently offered online at UMass Lowell) or equivalent from an accredited institution of higher education.

REQUIRED COURSES (4)

- 23.200 Computer Aided Drafting - AutoCAD
- 23.480 Computer Aided Design - AutoDesk Inventor
- 23.484 Introduction to ProENGINEERING
- 23.485 Introduction to SolidWorks

CERTIFICATE IN COMPUTER ENGINEERING TECHNOLOGY

The Certificate Program in Computer Engineering Technology is designed to provide students with a broad-based knowledge of digital electronics, microprocessors and advanced digital technologies. Students enrolled in the program must complete the seven courses listed below. The curriculum includes engineering science and design courses that provide a balanced view of hardware, software, application trade-offs and the basic modeling techniques used in computer engineering. All the courses in this certificate program can be applied towards the B.S. Degree in Electronic Engineering Technology.

REQUIRED COURSES (7)

- 17.341 Logic Design I and Lab
- 17.342 Logic Design II and Lab
- 17.353 Digital Electronics
- 17.383 Microprocessors A
- 17.384 Microprocessors B
- 90.267 C Programming
- 90.268 C++ Programming

CERTIFICATE IN ELECTRONICS TECHNOLOGY

The Certificate Program in Electronics Technology is designed to provide students with a broad-based knowledge of circuit theory and electronics, with laboratory work included to ensure that good hands-on experience is acquired along with the deep understanding of fundamental and changing technologies. All the computer courses in this certificate program can be applied towards the A.S. or B.S. Degree in Electronic Engineering Technology.

REQUIRED COURSES (8)

- 17.213 Circuits I
- 17.214 Circuits II and Laboratory
- 17.215 Circuits III and Laboratory
- 17.216 Circuits IV
- 17.355 Electronics I & Laboratory
- 17.356 Electronics II & Laboratory
- 17.357 Electronics III & Laboratory
- 17.358 Electronics IV & Laboratory

CERTIFICATE IN PLASTICS ENGINEERING TECHNOLOGY

The Plastics Engineering Technology Certificate provides professional training in plastics industry theory and technology. Students are given practical instruction applicable to materials, processing and design engineering. Courses are taught by the Department of Plastics Engineering's staff of international experts.

This program is designed to serve students already working in positions in plastics or packaging who need formal education in their work areas.

REQUIRED COURSES (5)

- 27.201 Plastics Material Science I (Commodity Thermoplastics)
- 27.202 Plastics Material Science II (Engineering Thermoplastics)
- 27.219 Introduction to Plastics Processing
- 27.331 Injection Molding
- 27.345 Principles of Extrusion

ELECTIVE COURSES

Choose 2 plastics engineering technology courses with a 27- -- prefix. See current course listings on our website for a list of available 27- -- courses.

CERTIFICATE IN MANUFACTURING TECHNOLOGY

The Certificate Program in Manufacturing Technology is designed for technical personnel, supervisors and managers involved in the many manufacturing technology disciplines that require a broad understanding of manufacturing processes, automation methods and environments. Focusing on the technology of manufacturing processes, the program is designed to correlate theoretical knowledge and the real-world environment of manufacturing technology.

REQUIRED COURSES (7)

- 23.101 Engineering Graphics
- 23.200 Computer Aided Drafting
- 23.301 Manufacturing Technology Laboratory
- 23.305 Manufacturing Processes
- 23.314 Manufacturing Productivity
- 23.414 Engineering Economics
- 23.419 Computer Aided Manufacturing

CERTIFICATE IN WATER TREATMENT

Due to new EPA regulations, within the next decade numerous communities will be constructing and operating new drinking water facilities in Massachusetts. Personnel in charge of these facilities will need to be certified. The Certificate Program in Water Treatment provides the most effective way to prepare for the water treatment certification exams.

Courses in this program are intended to provide students with the technical knowledge to operate and maintain physical/chemical water treatment facilities and water distribution systems. The Certificate in Water Treatment is for individuals seeking to enter the field of water treatment and for those currently working in the area of water treatment and distribution.

REQUIRED COURSES (7)

- 15.131 Environmental Chemistry I
- 15.132 Environmental Chemistry II
- 15.272 Water Supply & Treatment Operations I
- 15.274 Water Works Operations Lab I
- 15.355 Water Distribution Systems
- 15.372 Water Supply and Treatment Operations II
- 15.152 Water Biology

CERTIFICATE IN WASTEWATER TREATMENT

The demand for municipal and industrial wastewater treatment plant operators is expected to increase well into the next decade. In response to the demand, UMass Lowell is offering the Certificate Program in Wastewater Treatment.

This certificate program prepares students for all levels of state certification required to manage and operate a modern wastewater treatment facility. The program consists of seven courses which, when taken together, demonstrate expertise in the area of wastewater treatment. The program is designed for individuals seeking to enter the field of wastewater treatment and for those in the field who want to upgrade their skills or achieve a higher level of state certification. Courses in the program cover both municipal (biological) plants and industrial (physical/chemical) treatment plant operations.

REQUIRED COURSES (7)

- 15.131 Environmental Chemistry I
- 15.132 Environmental Chemistry II
- 15.261 Wastewater Treatment Plant Operations I
- 15.263 Wastewater Operations Lab I
- 15.280 Industrial Waste Treatment
- 15.361 Wastewater Treatment Plant Operations II
- 15.152 Water Biology

CERTIFICATE IN LAND SURVEYING

Land surveyors manage one or more survey parties who measure distances, directions and angles between points and elevations of points, lines and contours on the earth's surface. They research legal records and look for evidence of previous boundaries. They record the results of the survey, verify the accuracy of data and prepare plans, maps and reports. Surveyors who establish official boundaries must be licensed by the state in which they work.

New technology and government regulations are changing the nature of work of surveyors and survey technicians. Surveyors will need to upgrade their knowledge and skills in these new regulations and technologies and become familiar with environmental regulations on the local, state and federal levels.

The Certificate in Land Surveying can prepare students for licensure in Massachusetts, when combined with additional state requirements. Many of the courses may be applied to the A.S. Degree in Civil Engineering Technology: Surveying Option and/or to the B.S. Degree in Civil Engineering Technology.

REQUIRED COURSES (6)

- 92.123 Precalculus Mathematics II
- 23.101 Engineering Graphics
- 15.123 Surveying I
- 15.124 Surveying II
- 15.262 Legal Aspects of Land Surveying
- 15.299 Surveying III