



Continuing Studies, Corporate & Distance Education
<http://continuinged.uml.edu/online/biosafety.cfm>

The Online Graduate Certificate Program in Laboratory & Biological Safety

Available Online or On Campus!

The Online Graduate Certificate in Laboratory and Biological Safety is one of the few academic credit programs in biosafety available in the United States today. By making this certificate program available to students entirely online, the University of Massachusetts Lowell is providing an affordable, accessible way for individuals to enter the field of biological and laboratory safety. The program is designed to provide certificate candidates with the principles of identification, evaluation and control of biological and laboratory hazards. Topics include basic occupational health and safety including chemical and ergonomic hazards, biological hazard risk assessment, disinfection and sterilization, aerobiology, laboratory environmental health and safety management, laboratory design, laboratory hood requirements and many other subjects.

Audience

Scientists responsible for biological and/or laboratory safety, practicing occupational and environmental hygienists or biosafety officers and those interested in embarking upon a career in biological and/or laboratory safety.

Admission Requirements

All applicants must have already completed their bachelor's degree, preferably in a life sciences discipline, from an accredited institution of higher education, and have taken at least three undergraduate-level biology courses such as Microbiology, Cell Biology, and/or Molecular Biology or Biochemistry, or have significant work experience in biosafety (permission of the program coordinator required), prior to applying into the program.

Curriculum

Required Courses - Online

- 19.508 Principles and Practices of Biological Safety (*Available Spring 2010*)
- 19.516 Laboratory Environmental Health and Safety
- 19.525 Introduction to Occupational & Environmental Hygiene & Ergonomics

Electives (choose one):

ELECTIVES AVAILABLE ONLINE

- 36.541 Introduction to Public Health and the Public Health Laboratory
- 30.550 Human Development and Pathophysiology
- 36.580 Clinical Applications of Molecular Genetics
- 32.504 Health Data Analysis

ELECTIVES AVAILABLE ON CAMPUS

- 19.575 Introduction Biostatistics and Epidemiology
- 19.615 Solutions to Work Environment Hazards
- 19.651 Work Environment Policy and Practice
- 36.511 Medical Bacteriology
- 36.515 Clinical Virology and Serology Laboratory
- 81.567 Molecular Biology
- 81.572 Virology

For registration information and course schedules, visit <http://continuinged.uml.edu/online/biosafety.cfm>



CONTACT INFORMATION

For program-specific questions, please contact Professor Susan Woskie, Ph.D., CIH and Graduate Biosafety Program Coordinator at 978-934-3295 or email her at Susan_Woskie@uml.edu

For general advising on registering for courses, tuition and admission into the program, please contact UMass Lowell's Student Support Center at 800-480-3190 or email Continuing_Education@uml.edu



Course Descriptions

REQUIRED COURSES

19.508 Principles and Practices of Biological Safety

This course is designed to provide an overview of hazard recognition, evaluation and control of potentially hazardous biological materials. This introduction to the field will cover the potential risks of working with biological materials, the use of engineering, work practices and administrative measures for hazard control and regulations governing the area of biosafety. 3 credits. Special Notes: Requires working knowledge of Microbiology and permission of instructor.

19.516 Laboratory Environmental Health and Safety

This course is designed to provide an overview of hazard recognition, evaluation and control in laboratory environments. This introduction to the field will cover the potential risks of working with chemicals, radioactive materials, animals and biological materials. It will also introduce the use of engineering, work practices and administrative measures for hazard control and regulations governing the area of laboratory safety. 3 credits.

19.525 Introduction to Occupational & Environmental Hygiene & Ergonomics

A survey course covering introductory topics in ergonomics and occupational/industrial hygiene. Ergonomics topics include work measurement, anthropometry, biomechanics, psychosocial stress. Special emphasis is placed on the recognition and control of work-related musculoskeletal disorders. Occupational hygiene topics will cover the identification, measurement, and control of chemical hazards in the work environment including principles and applications of air sampling, ventilation and the use of personal protective equipment, with special attention to respiratory protection. 3 credits.

ELECTIVES (choose one)

ELECTIVES AVAILABLE ONLINE

36.541 Introduction to Public Health and the Public Health Laboratory

This course is designed to provide an overview of public health and the public health laboratory covering topics such as the legal basis and history of public health, public health structure, communications and interactions, and epidemiology. Emphasis will be placed on the role of the public health laboratory and its core functions, its role in policy development, infectious disease, environmental issues, emergency preparedness, newborn screening, global issues, and public health research. Public health laboratory methodology, regulation and improvement, and quality assurance will also be examined. 3 credits.

30.550 Human Development and Pathophysiology

The physiological steady state of the human body and disruptions that result over the life span will be examined as well as the pathophysiological mechanism manifested in disease states. The course addresses defense, compensating, and adaptive responses to the pathophysiological processes as they apply to the various systems rather than being a survey course of diseases. 3 credits.

36.580 Clinical Applications of Molecular Genetics

This course begins with a review of basic molecular genetics, followed by a discussion of the human genome project, including the application of its technology to the management of genetic diseases. Laboratory techniques used to analyze pre- and postnatal tissue samples is described, including RFLP-Southern blot technology, real-time PCR, VNTR assessment, and gene expression analysis by microchip arrays. Cloning and stem cell analysis follows, including the ethical, legal, and social issues surrounding these areas. Cancer genetics and cytogenesis is presented, with emphasis on molecular changes that lead to the onset of cancer. Genetic treatments for cancer are reviewed. Gene therapy is detailed, including the historical perspective, gene therapy vectors and their mode of action, and the newest methods for treating genetic disorders at the DNA level. Structural and functional genomics follows, centering around the

creation of pharmaceuticals solely based on the genetic basis of diseases. The course ends with a discussion of the human proteome project, including goals and objectives, current progress, and the storage of data in complex bioinformatic databases. 3 credits.

32.504 Health Data Analysis

This course focuses on the application of both descriptive and inferential statistical techniques to the analysis of health care data. Students will learn how to a) formulate research questions and hypotheses answerable through quantitative data analysis, b) use computer software (Statistical Package for The Social Sciences, SPSS) and an online Probability Calculator to analyze data, and c) interpret the meaning of statistical findings. Areas covered include graphs, measurement, normal distribution, hypothesis testing, t tests, ANOVA, correlation and regression, and chi-square. Emphasis is on using weekly SPSS assignments to analyze research questions using a sample data base from the Framingham Heart Study. A prior elementary statistics course is required. 3 credits.

ELECTIVES AVAILABLE ON CAMPUS

Visit www.uml.edu/catalog/graduate for complete descriptions on the following courses:

19.575 Introduction Biostatistics and Epidemiology

Covers to probability theory, Gaussian statistics, linear regression, epidemiologic study designs, causal inference, bias, and confounding.

19.615 Solutions to Work Environment Hazards

Techniques for controlling exposures including substitution, ventilation, administrative controls, and personal protective equipment.

19.651 Work Environment Policy and Practice

An overview of occupational safety and health regulations and policy in the U.S. as well as worker training and health and safety program components.

36.511 Medical Bacteriology

Covers the basic principles of clinical diagnostic microbiology and includes a detailed survey of the medically important pathogenic bacteria and normal flora

36.515 Clinical Virology and Serology Laboratory

Covers the basic principles of serological and immunodiagnostic techniques as well as viral pathogenesis, detection and serodiagnosis of viral disease.

81.567 Molecular Biology

A study of the principles and specialized techniques of cloning, purifying, and manipulating recombinant DNA molecules.

81.572 Virology

A study of bacterial, animal, and plant viruses, including viral structure, modes of replication, biochemistry of the infected cell, genetic properties, and viral oncogenesis.



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