

BIOM - Biology-Micro

BIOM 101 Careers in Microbiology: 1 Credits (1 Lec)

The course introduces students to educational and career opportunities in the fields of medical, molecular, ecological, and environmental microbiology. The course introduces students to the various options in the microbiology degree program. It will emphasize the differences in the options and the employment opportunities in each once a degree has been obtained.

BIOM 103IN Unseen Universe: Microbes: 3 Credits (2 Lec, 1 Lab)

Beneficial and harmful effects of microorganisms on individual health, public health, food and water quality; are relevant to an informed citizen of the 21st century. Current news topics and historical perspectives are emphasized. Laboratory exercises investigate microbial activity in our everyday world.

BIOM 107CS Molecules of Life: 3 Credits (3 Lec)

Introduction to uses of biological molecules for improving health and agriculture. Gene therapy and DNA fingerprinting are discussed in relation to social/moral issues. Intent of course is to help students develop a rational approach to evaluate cost/benefits of biotechnology to society.

BIOM 210RN Environmental Health Science: 3 Credits (3 Lec)

PREREQUISITE: WRIT 101W or exempt from course based on ACT or SAT scores. Environmental health science emphasizes how human health is linked to the health of the environment. This course combines classroom instruction with current events discussions, training activities and field trips to explore physical, chemical and biological factors that impact human health, including water pollution and treatment, air pollution, food safety, vectorborne diseases, hazardous waste disposal, community sanitation, emergency preparedness and hazard control in institutional and occupational environments

BIOM 250 Microbiology for Health Sciences: Infectious Diseases: 3 Credits (3 Lec)

Introduction to the world of microorganisms and the role of viral, bacterial, fungal and parasitic infectious agents in human health. Emphasis is on public health aspects of transmission, epidemiology, treatment and control of these diseases. Also host-pathogen interactions with regards to pathogenesis and host immune responses are considered.

BIOM 251 Microbiology for Health Sciences Lab: 1 Credits (1 Lab)

PREREQUISITE: Pre- or co-requisite: BIOM 250 Microbiology for Health Sciences This is an introductory laboratory course in microbiology focused primarily on medical microbiology. The course is designed to give students practical experience in the growth of microorganisms, primarily bacteria, including methods for identification and characterization of important pathogens. The lab includes safe handling procedures, spills, disposal, and personal protective equipment

BIOM 290R Undergraduate Research: 1-6 Credits (1-6 Other)

Directed undergraduate research/creative activity which may culminate in a written work or other creative project. Course will address responsible conduct of research. May be repeated.
Repeatable up to 12 credits.

BIOM 291 Special Topics: 3 Credits (2 Lab, 2 Other)

PREREQUISITE: None required but some may be determined necessary by each offering department. Courses not required in any curriculum for which there is a particular one time need, or given on a trial basis to determine acceptability and demand before requesting a regular course number
Repeatable up to 12 credits.

BIOM 292 Independent Study: 1-4 Credits (1-4 Other)

PREREQUISITE: Consent of instructor and approval of instructor.
Directed research and study on an individual basis
Repeatable up to 6 credits.

BIOM 360 General Microbiology: 5 Credits (3 Lec, 2 Lab)

PREREQUISITE: BIOB 160 or BIOB 260. An introduction to major topics and subdisciplines in microbiology including microbial diversity and classification, microbial anatomy and physiology, microbial genetics, microbial ecology, medical microbiology and immunology, epidemiology and public health, and biotechnology

BIOM 363 Eukaryotic Cell Biology: 3 Credits (3 Lec)

PREREQUISITE: Microbiology major or consent of department.
The course will provide an understanding of how eukaryotic cells, in eukaryotic microorganisms such as protozoans and fungi, and multicellular eukaryotic organisms work. Topics covered include membranes, organelles, membrane trafficking, signaling, cell adhesion, and the extracellular matrix, cytoskeleton, cell motility and a comprehensive section on the cell cycle, which integrates all the other topics. Basic molecular biology relevant to each of these topics will also be covered

BIOM 400 Medical Microbiology: 3 Credits (3 Lec)

PREREQUISITE: BIOM 360; Recommended BIOB 410 and BIOM 435.
Selected medically relevant viral and bacterial pathogens will be discussed at length with an emphasis on infection, immune responses and disease

BIOM 405 Host-Associated Microbiomes: 3 Credits (3 Lec)

PREREQUISITES: BIOM 360 or BIOB 160 and CHMY 123 or BCH 380

This course will introduce students to the microbial ecosystems that colonize human and animal hosts, detailing their essential roles in host nutrition, health and development. Students will also be exposed to modern molecular techniques used to study these systems.

BIOM 410 Microbial Genetics: 3 Credits (3 Lec)

PREREQUISITE: BIOM 360, BCH 380. The students will become familiar with concepts in microbial genetics, including DNA replication, RNA, and protein biosynthesis. Other concepts covered in the course include bacteriophage and plasmid biology, gene regulation, mobile genetic elements, and the fundamentals of genetic engineering

BIOM 415 Microbial Diversity, Ecology, and Evolution: 3 Credits (3 Lec)

PREREQUISITE: BIOM 360, BCH 380, or consent of instructor The diversity of prokaryotic and eukaryotic microorganisms will be explored from both classical phenotypic and contemporary genotypic perspectives. The linkage between microbial diversity, its evolutionary origins, and its ecological value will be emphasized

BIOM 419 Programming for Biologists: 3 Credits (2 Lec, 1 Lab)

This course will introduce computer programming languages commonly used in the biological sciences, including Python, R, and command line driven applications. Common commands in each programming language/application will be covered in the context of biological problem-solving using manipulation and analysis of large datasets.

BIOM 421 Concepts of Plant Pathology: 3 Credits (2 Lec, 1 Lab)

PREREQUISITE: BIOB 110CS or BIOO 220. An introductory course in the study of plant diseases. Includes plant pathogens, etiology of disease, and various control strategies

BIOM 423 Mycology: 3 Credits (2 Lec, 1 Lab)

PREREQUISITE: BIOB 100IN or BIOB 110CS or BIOB 160 or BIOB 170IN or BIOM 103IN. . This course surveys the immense diversity of fungi, including all major groups with emphasis on structures, life cycles, identification, and ecology. It provides a basis of knowledge for the rapidly expanding relevance of fungi in research, medicine, agriculture, biotechnology, and industry. This course is co-convened with BIOM 523

BIOM 425 Toxicology: Science of Poisons: 3 Credits (3 Lec)

PREREQUISITE: BCH 380 or BCH 441 or BCH 442 This course is appropriate for pre-med, health professional, and environmental science majors. Topics include history principles, and mechanisms of toxicology, disposition of toxicants, chemical carcinogens, target organ toxicity, clinical and environmental toxicology. Co-convened with MB 527

BIOM 427 General Parasitology: 4 Credits (3 Lec, 1 Lab)

Study of the life cycles, biochemistry, molecular parasitology, pathogenesis, identification and treatment of the major parasitic groups, including parasitic protozoa, monogeneans, digeneneans, cestodes, nematodes, acanthocephalans, and parasitic arthropods.

BIOM 430 Applied and Environmental Microbiology: 4 Credits (3 Lec, 1 Lab)

PREREQUISITE: BIOM 360. The course introduces students to complex concepts in water microbiology, food microbiology, sterility and disinfection, the use of microorganisms in manufacturing processes and in the degradation of contaminants in the environment

BIOM 431 Medical Bacteriology: 3 Credits (3 Lec)

PREREQUISITE: BIOM 360; recommend BIOB 410. This course considers the nature of the agents of bacterial infectious disease; the etiology, signs, symptoms, pathogenesis, diagnosis, therapy, epidemiology, and prevention of specific diseases. The major objective is for students to gain an understanding of bacteria that cause disease in humans

BIOM 432 Med Bacteriology Lab: 2 Credits (2 Lab)

PREREQUISITE: BIOM 360

COREQUISITE: BIOM 431. Laboratory methods designed to teach techniques used in culturing and identifying bacterial pathogens and normal flora from clinical specimens. Procedures used to test the antibiotic susceptibility of pathogenic bacteria

BIOM 435 Virology: 3 Credits (3 Lec)

PREREQUISITE: BIOM 360 or BIOB 375 or BIOH 320 or BCH 380 or BCH 442 or BCH 444R. Fundamentals of virology with emphasis on animal viruses of medical importance. Molecular aspects of structure, replication transmission and host response to viral infection will be covered

BIOM 441 Eukaryotic Pathogens: 4 Credits (3 Lec, 1 Lab)

PREREQUISITE: BIOM 360; recommend BCH 380; credit cannot be applied towards major requirements for both BIOM 427 and BIOM 441. The study of medically important parasite and fungal pathogens. Covers the biology, taxonomy, host/parasite relationships, pathogenesis, diagnosis and treatment of protozoan and helminth parasites; as well as of pathogenic fungi; with laboratory procedures in fungal isolation and identification

BIOM 450 Microbial Physiology: 3 Credits (3 Lec)

PREREQUISITE: BCH 380, BIOM 360. An in-depth examination of microbial cell structure and function, bioenergetics, intermediary metabolism and its control, and the orchestration and regulation of cellular functions that enable microbes to adapt to and survive in their environment

BIOM 452 Soil & Environmental Microbiology: 3 Credits (3 Lec, 3 Other)

PREREQUISITE: CHMY 143, ENSC 245IN. Microorganisms in soil environments: Focuses on soil microbial ecology, emphasizing relevant aspects of: i) microbial metabolism, physiology and genetics; ii) plant-microbe interactions; and iii) biotransformations of inorganic or organic contaminants

BIOM 455R Research Mthds in Microbiology: 4 Credits (3 Lec, 1 Lab)

PREREQUISITE: BIOM 360 and BCH 380. Fundamentals of research methodology for undergraduate and graduate students in microbiology and related disciplines. Theory and application of techniques, reagents, and instrumentation will be emphasized in the lecture and laboratory. The emphasis in the course will be on recombinant DNA methodology, and the safe and effective use of radioisotopes
Repeatable up to 8 credits.

BIOM 457R Research Methods in Immunology: 4 Credits (2 Lec, 2 Lab)

PREREQUISITE: BIOM 360. Theory and application of techniques, reagents, and instrumentation will be emphasized in the lecture and laboratory. The emphasis in the course will be on experimental research involving flow cytometry, microscopy, and protein biochemistry methodology

BIOM 460 Infectious Diseases Ecology and Spillover: 3 Credits (3 Lec)

PREREQUISITE: BIOM 360 or BIOE 370 or consent of instructor. Disease Ecology is highly interdisciplinary and merges concepts from microbiology, immunology, evolution, mathematics, epidemiology, medicine, veterinary medicine, ecology, and geography. Thus this discipline is positioned to address major global health issues. Students will study questions such as: What factors, across molecular to landscape scales, must align to allow pathogens to jump from animals to humans? Why is monkeypox spillover increasing in West Africa as immunity to smallpox wanes? Why do wolves experience periodic outbreaks of distemper in Yellowstone? Why did Ebola recently spread through multiple West African countries, whereas previous outbreaks were restricted to small regions in Central Africa?
Repeatable up to 3 credits.

BIOM 465 Plant-Pathogen Interactions: 3 Credits (3 Lec)

This course is to teach students the molecular mechanisms by which plants and pathogens/insects interact during the progress of pathogenesis or resistance, the understandings of how plants recognize relatively conserved microbial patterns to active defense. Co-convened with PSPP 565.

BIOM 475R Preveternary Internship: 2-4 Credits (2-4 Other)

PREREQUISITE: Junior standing and consent of instructor. An individualized assignment arranged with an agency, business, or other organization to provide guided experience in the field
Repeatable up to 4 credits.

BIOM 490R Undergraduate Research: 1-4 Credits (1-4 Other)

Directed undergraduate research/creative activity which may culminate in a research paper, journal article, or undergraduate thesis. Course will address responsible conduct of research. May be repeated.
Repeatable up to 12 credits.

BIOM 491 Special Topics: 1-4 Credits (1-4 Lec)

PREREQUISITE: Course prerequisites as determined for each offering. Courses not required in any curriculum for which there is a particular one-time need, or given on a trial basis to determine acceptability and demand
Repeatable up to 12 credits.

BIOM 492 Independent Study: 3 Credits (3 Other)

PREREQUISITE: Junior standing, consent of instructor, and approval of department head. Directed research and study on an individual basis
Repeatable up to 6 credits.

BIOM 494 Seminar/Workshop: 1 Credits (1 Other)

PREREQUISITE: BIOM 360 and junior standing. Senior capstone course. Topics offered at the upper division level which are not covered in regular courses. Students participate in preparing and presenting discussion material. When taken in the senior year, this course fulfills the senior capstone course requirement
Repeatable up to 2 credits.

BIOM 497 Educational Methods: Microbiology: 2 Credits (2 Lec)

PREREQUISITE: Consent of Instructor. Instruction and practice in effective teaching methods; practice in preparing laboratory materials, assisting a class and grading

BIOM 498 Microbiology Internship: 1-4 Credits (1-4 Other)

PREREQUISITE: Junior standing, consent of instructor, and approval of department head. An individualized assignment arranged with an agency, business, or other organization to provide guided experience in the field
Repeatable up to 99 credits.

BIOM 498R Biotech Internship: 1-4 Credits (1-4 Other)

PREREQUISITE: Junior standing, consent of instructor, and approval of department head. An individualized assignment arranged with an agency, business, or other organization to provide guided experience in the field

BIOM 499 Biotechnology Capstone: 2 Credits (2 Other)

PREREQUISITE: BIOM 498R. Senior capstone course. Participants in this seminar section will bring closure to the student's required internship. Students will have the opportunity to refine their public speaking and writing skills through synthesis of the goals, progress, and outcome of their industrial or research laboratory experience. Exposure to many different types of internship outcomes will broaden the student's perception of the disciplines which contribute to the field of biotechnology

BIOM 505 Host Associated Microbial Ecosystems: 4 Credits (3 Lec, 1 Lab)**BIOM 523 Mycology for Graduates: 3 Credits (2 Lec, 2 Lab)**

PREREQUISITE: Basic Biology Course or equivalent

This course is co-convened with BIOM 423. The course surveys the incredible diversity of fungi, including major groups with emphasis on structures and identification. The recent explosion of knowledge on fungi in research, medicine, agriculture, biotech begins with basic mycology.