**Microbiology (MCRO)**

**MCRO Courses**

**MCRO 100. Introduction to Microbiology Research. 2 units**
CR/NC
Group research experience in microbiology through participation in a faculty-student research project. Foundations of the scientific method including literature review, design of experiments, common laboratory techniques, data analysis, interpretation of results and scientific communication. Intended for freshmen and sophomores with no research experience. Priority to MCRO majors. Credit/No Credit grading only. 1 seminar, 1 laboratory.

**MCRO 221. Microbiology. 4 units**
2020-21 or later catalog: GE Area B2
2020-21 or later catalog: GE Area B3
2019-20 or earlier catalog: GE Area B2
2019-20 or earlier catalog: GE Area B4
Prerequisite: CHEM 110 or CHEM 111 or CHEM 124 or CHEM 127 or PSC 102.

Morphology, metabolism, classification, and identification; microbiology of air, soil, water, and foods with applications to industry, agriculture, medicine, and public health. Not open to students with credit in MCRO 224; not open for major credit for BIO/MCRO/MSCI. 3 lectures, 1 laboratory. Fulfills GE Areas B2 and B3 (GE Areas B2 and B4 for students on the 2019-20 or earlier catalogs).

**MCRO 222. General Microbiology I. 5 units**
2020-21 or later catalog: GE Area B2
2020-21 or later catalog: GE Area B3
2019-20 or earlier catalog: GE Area B2
2019-20 or earlier catalog: GE Area B4
Prerequisite: BIO 161 and CHEM 111, CHEM 124 or CHEM 127. Recommended: CHEM 128.

Microbial cellular structure and function, nutrition and growth dynamics, control of microbial growth, metabolism, genetics, and viruses. Both prokaryotic and eukaryotic microorganisms emphasized. 3 lectures, 2 laboratories. Fulfills GE Areas B2 and B3 (GE Areas B2 and B4 for students on the 2019-20 or earlier catalogs).

**MCRO 223. General Microbiology II. 5 units**
Prerequisite: MCRO 222.

Microbial diversity, systematics, ecology, and symbiotic relationships. Introduction to host-microorganism interactions including pathogenesis, epidemiology, and immunology. 3 lectures, 2 laboratories.

**MCRO 301. Wine Microbiology. 4 units**
Prerequisite: MCRO majors must have MCRO 224; WVIT majors must have MCRO 221 or MCRO 224; and WVIT 202; open to MCRO or WVIT majors only.

Wine yeasts, bacteria, and molds: morphology and methods of identification; successful alcoholic and malolactic fermentations; management and prevention of unwanted microbial growth; microorganisms and flavor development. 3 lectures, 1 laboratory. Crosslisted as MCRO/WVIT 301.

**MCRO 302. Emerging Infectious Diseases. 3 units**
Prerequisite: BIO 161; and MCRO 221 or MCRO 224.

Recent outbreaks of human diseases, interrelationships between infectious disease agents, human biology, and the environment. Infectious agents and disease processes, virulence mechanisms, and host immune response. Clinical approaches and surveillance methods to detect, investigate, and monitor emerging pathogens. Factors involved in the accelerating emergence of diseases and bioterrorist agents. 3 lectures.

**MCRO 342. Public Health Microbiology. 4 units**
Prerequisite: MCRO 221 or MCRO 224.

Principles of disease prevention and control. Water-, food-, and air-borne microbial contaminations and epidemiology of ensuing diseases. 3 lectures, 1 laboratory.

**MCRO 402. General Virology. 4 units**
Prerequisite: BIO 351 or CHEM 373, or graduate standing in Biological Sciences. Recommended: BIO 452.

Infective macromolecules (prions, viroids, and viruses) associated with microbes, plants, and animals. Epidemiology, immune responses, pathogenicity, carcinogenesis, diagnoses, vaccination, and therapy. 3 lectures, 1 laboratory.

**MCRO 421. Food Microbiology. 4 units**
Prerequisite: MCRO 221 or MCRO 224. Recommended: CHEM 212/312.

Physiological activities of microorganisms involved in the preparation, preservation, deterioration, and toxicity of foods and related products. Detection and prevention of spoilage microorganisms and foodborne pathogens. 3 lectures, 1 laboratory.

**MCRO 423. Medical Microbiology. 5 units**
Prerequisite: Junior standing; MCRO 225; and CHEM 216, CHEM 312 or CHEM 316; and consent of instructor.


**MCRO 424. Microbial Physiology. 5 units**
Prerequisite: MCRO 225 and CHEM 313 or CHEM 371, or graduate standing in Biological Sciences.

Cellular structure and life processes of bacteria; chemical composition, growth, and metabolism. General biological and evolutionary considerations. 3 lectures, 2 laboratories.

**MCRO 432. Microbial Biotechnology. 3 units**
Prerequisite: MCRO 221 or MCRO 224; and BIO 303 or BIO 351 or equivalent; and CHEM 216, CHEM 312 or CHEM 316 or equivalent, or graduate standing in Biological Sciences.

Principles and methods used for production of enzymes, pharmaceuticals, chemicals, and food additives using micro-organisms. Topics include screening and strain improvement, regulation of metabolite production, genetic engineering, heterologous gene expression systems, large-scale production, and intellectual property. 3 lectures.
MCRO 436. Microbial Ecology. 4 units
Prerequisite: BIO 160; BIO 161; BIO 263; and MCRO 221 or MCRO 224; or graduate standing in Biological Sciences.

Ecology and interactions of microorganisms in natural environments.
Role of microorganisms in ecosystem function such as nutrient cycling, extreme environments, symbioses. Applications of microorganisms in the environment such as bioremediation, biocontrol, biofuels. Field trip may be required. 2 lectures, 2 activities.