Microbiology and Molecular Genetics

Introduction

Overview of modern microbiology, emphasizing current microbiology research: significance to modern biological science and impact on society.

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Microbiological techniques and procedures to study physiology and genetics of bacteria and bacteriophages. Collection and critical assessment of quantitative data and written communication of results.

Eukaryotic Cell Biology

Spring. 3(3-0) P.M.: (BS 111 or LBS 145 or LBS 149H) and (BMB 401 or concurrently) SA: MIC 403, MPH 403

Structure and function of the cell and molecular mechanisms that underlie cell processes.

Virology

Spring. 3(3-0) P.M.: (BMB 462 or concurrently) RB: (MMG 409) SA: MPH 403


Prokaryotic Cell Physiology

Fall. 3(3-0) P.M.: (MMG 301 and BMB 461 or concurrently) SA: MIC 401, MPH 401

Prokaryotic cell structure and function. Growth and replication. Macromolecular synthesis and control.

Microbial Ecology

Spring. 3(3-0) Interdepartmental with Crop and Soil Sciences. RB: (MMG 301) SA: MPH 425

Microbial population and community interactions. Microbial activities in natural systems, including interactions with plants or animals.

Biogeochemistry

Summer. 3 credits. Summer: Given only at W.K. Kellogg Biological Station. Interdepartmental with Crop and Soil Sciences; Geological Sciences; Zoology. RB: (BS 110 or LBS 144 or LBS 148H or BS 111 or LBS 145 or LBS 149H) and (CEM 143 or CEM 251) SA: MPH 426

Integration of the principles of ecology, microbiology, geochemistry, and environmental chemistry. Societal applications of research in aquatic and terrestrial habitats.

Microbial Genetics

Spring. 3(3-0) P.M.: (BMB 461 or concurrently) RB: (MMG 301 or ZOL 341) SA: MIC 401, MPH 401

Genetics of bacteria, their viruses, plasmids, and transposons. Emphasis on genetic principles.

Microbial Genomics

Spring. 3(3-0) P.M.: (MMG 431) RB: (MMG 421 or BMB 461) and (CSE 101)


Food Microbiology

Spring. 3(3-0) Interdepartmental with Food Science. Administered by Department of Food Science and Human Nutrition. P.M.: (MMG 201 or MMG 301) and completion of Tier I writing requirement. R: Not open to freshmen. SA: MPH 440

Major groups of microorganisms of importance to the food industry. Ecological, physiological, and public health aspects.
Microbiology and Molecular Genetics—MMG

491 Current Topics in Microbiology
   Spring. 3(4-0) R: Open only to seniors in the Department of Microbiology and Molecular Genetics or LBS Environmental Biology/Microbiology or Microbiology coordinate major. SA: MPH 491
   Capstone experience for microbiology majors. Presentation and discussion of journal articles. Writing of position papers. Topics such as microbial physiology, ecology, genetics, molecular biology, virology, immunology, or pathogenesis.

492 Undergraduate Research Seminar
   Spring. 1(1-0) P: (MMG 499 or MMG 499H) R: Open only to seniors in the Department of Microbiology and Molecular Genetics or LBS Environmental Biology/Microbiology or Microbiology coordinate major. SA: MPH 492
   Participation and group discussion of undergraduate research results.

499 Undergraduate Research
   Fall. Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to students in the Department of Microbiology and Molecular Genetics or LBS Environmental Biology/Microbiology or Microbiology coordinate major. SA: MPH 499
   Participation in a laboratory research project.

499H Honors Research
   Fall. Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to Honors College students in the Microbiology or Environmental Biology/Microbiology major or LBS Environmental Biology/Microbiology coordinate major. SA: MPH 499H
   Research project with thesis and oral report. A portion of Microbiology capstone experience.

522 Medical Microbiology and Immunology
   Spring. 3(4-2) R: Graduate-professional students in colleges of Human and Osteopathic Medicine. SA: MPH 522
   Basic principles of microbiology (bacteriology, virology, mycology, and parasitology) and immunology and their relation to disease in humans.

561 Veterinary Immunology
   Fall. 2(2-0) R: Open only to graduate-professional students in the College of Veterinary Medicine. SA: MPH 561, MIC 561
   Concepts of cell biology, immunology, microbiology, and immunopathology related to the healthy state and the host response to infection and parasitism.

567 Veterinary Microbiology and Infectious Diseases I
   Spring. 5(4-3) R: Open only to graduate-professional students in College of Veterinary Medicine. SA: MIC 563, MIC 565, MPH 563, MPH 565
   Not open to students with credit in VM 564.
   Structure, function, and diagnostic characteristics of bacteria and fungi related to pathogenesis, transmission, control, host response, therapy, and management of selected diseases of animals.

569 Veterinary Microbiology and Infectious Diseases II
   Fall. 5(4-3) R: Open only to graduate-professional students in College of Veterinary Medicine. SA: MIC 563, MIC 565, MPH 553C, MPH 553D, MPH 563, MPH 565
   Structure, function, and diagnostic characteristics of viruses, protozoa, and helminths related to pathogenicity, transmission, control, host response, therapy, and management of selected diseases of animals.

660 Veterinary Clinical Bacteriology Clerkship
   Fall, Spring, Summer. 3 credits. RB: Completion of semester 5 of the graduate-professional program in the College of Veterinary Medicine.
   Guided clinical bacteriology experience.

662 Clinical Veterinary Virology Clerkship
   Fall, Spring, Summer. 3 credits. RB: Completion of semester 5 of the graduate-professional program in the College of Veterinary Medicine.
   Guided clinical virology experience.

664 Veterinary Clinical Parasitology Clerkship
   Fall, Spring, Summer. 3 credits. RB: Completion of semester 5 of the graduate-professional program in the College of Veterinary Medicine.
   Guided clinical parasitology experience.

690 Veterinary Microbiology Clerkship
   Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course. RB: Completion of 5 semesters of the graduate-professional program in the College of Veterinary Medicine. SA: MPH 690
   Laboratory-based investigation of microbiological problems pertinent to veterinary medicine.

801 Integrative Microbial Biology
   Fall. 4(4-0) Not open to students with credit in MMG 821 or MMG 829 or MMG 841 or MMG 827.
   Structural, metabolic, phylogenetic, and genomic diversity of microbes and microbial communities. Microbial ecology, evolution, and behavior. Regulation of gene expression. Microbial interactions with other microbes, animals, or plants

803 Topics in Integrative Microbial Biology
   Spring. 2(2-0) A student may earn a maximum of 10 credits in all enrollments for this course. P: (MMG 801 or concurrently)
   In-depth study of a particular topic from integrative microbial biology.

813 Molecular Virology
   Spring of even years. 3(3-0) R: Open only to graduate students in the Colleges of Human Medicine, Osteopathic Medicine, Veterinary Medicine, Natural Science, and Agriculture and Natural Resources. SA: MPH 813
   Molecular nature and biochemistry of replication of animal viruses. Current advances, research concepts, and the role of viruses in molecular biology research.

821 Microbial Physiology
   Fall of even years. 3(3-0) RB: (MMG 421) R: Open only to graduate students in the Colleges of Human Medicine, Osteopathic Medicine, Veterinary Medicine, Natural Science, and Agriculture and Natural Resources. SA: MPH 821
   Molecular architecture, assembly of cell parts, metabolism, and general physiology of typical eubacteria.

825 Cell Structure and Function
   Spring. 3(3-0) Interdepartmental with Biochemistry and Molecular Biology; Physiology. Administered by Department of Biochemistry and Molecular Biology. RB: BMB 401 or BMB 461. SA: BCH 825
   Morphological and physiological properties of groups of bacteria and archaea. Relationship of those properties to ecological niche and importance.

829 Advanced Microbial Ecology
   Spring of odd years. 3(3-0) Interdepartmental with Crop and Soil Sciences. SA: MPH 829
   Functional roles of microorganisms, their population dynamics and interactions, and their mechanisms of evolutionary change in natural communities, laboratory experiments, and mathematical models.

833 Microbial Genetics
   Fall. 3(3-0) R: Open only to graduate students in the Colleges of Human Medicine, Osteopathic Medicine, Veterinary Medicine, Natural Science, and Agriculture and Natural Resources. SA: MPH 833
   Gene structure and function. Genetic regulation at classical and molecular levels in prokaryotes and lower eukaryotes.

835 Eukaryotic Molecular Genetics
   Spring. 3(3-0) Interdepartmental with Genetics. RB: (BMB 462 and ZOL 341) R: Open only to graduate students in the Colleges of Agriculture and Natural Resources, Engineering, Human Medicine, Natural Science, Osteopathic Medicine, and Veterinary Medicine.
   Gene structure and function in animals, plants, and fungi. Basic aspects of modern human genetics and the genetic basis for disease. Molecular genetic analyses. Eukaryotic modeling systems.

841 Soil Microbiology
   Spring of even years. 3(3-0) Interdepartmental with Crop and Soil Sciences. RB: (MMG 425) SA: MPH 841
   Ecology, physiology, and biochemistry of microorganisms indigenous to soil.
MILITARY SCIENCE MS

Department of Military Science Office of the Provost

101B Leadership: The Military Profession Spring. 1(1-2) SA: MS 101 Not open to students with credit in MS 101A. Introduction to military leadership and fundamental concepts of leadership. Application of leadership doctrine. The role of the U.S. Army, Army Reserves, and National Guard. Leadership laboratory introduces basic military skills.

110 Army Leadership and Officer Development Fall. 1 to 2 credits. SA: MS 101, MS 101A Not open to students with credit in MS 101B. Duties and responsibilities of the Army officer and commissioned officer. Organizational structure of the Army, Army Reserve, and National Guard. The Army's role in joint operations. Introduction to Army values, leadership, customs, and traditions.

120 Introduction to Army Leadership and Problem Solving Spring. 1 to 2 credits. RB: (MS 101A or MS 101B) Fundamentals of basic Army leadership. Military problem solving process. Military briefing and writing skills. Goal setting and time management. Introduction to the Army's developmental counseling program.

201B Leadership: The Military Leader Fall. 1 to 2 credits. RB: (MS 101A or MS 101B) Introduction to effective leadership. Communications. Value of the United States Army. Responsibilities of military officers and professionalism. Laboratory includes tactics, marksmanship training, and military skills.

210 Values and Ethics of Army Leaders Fall. 1 to 2 credits. RB: (MS 120) SA: MS 201, MS 201A Not open to students with credit in MS 201B. Application of military case studies. Critical dilemmas in combat situations and the ethical decisions Army leaders make to ensure mission success. Understanding how to improve Army organizations and soldier performance. Introduction to the Army's leadership development program, battle drills, land navigation, and combat decision making.

MUSIC MUS

School of Music College of Arts and Letters

112 Chamber Music Fall. Spring. 1(0-2) A student may earn a maximum of 10 credits in all enrollments for this course. R: Open only to students in the School of Music. Rehearsal and performance of a broad range of chamber music literature.

113 Philharmonic Orchestra Fall. Spring. 1(0-5) A student may earn a maximum of 10 credits in all enrollments for this course. RB: High school and/or youth orchestra experience/or other college or university ensemble experience R: Audition required. Rehearsal and performance of symphonic and operatic repertoire.