MI Microbiology and Immunology

MI 120 MICROBES AND SOCIETY. (3)
Microbes and society focuses on the impact, good and bad, of microbes on humanity and civilization. The course explores the beneficial effects of microbes on the environment, agriculture, industry, biotechnology, and medicine. In addition, the course describes how microbes and microbial diseases have influenced the history and evolution of humans. The course also explores the negative impact of microbes as pathogens and emerging infectious agents on civilization. Host pathogen interactions including how microbes cause infectious diseases and how the host immune response clears infections and protects the host against re-infection with the same microbe are also covered in the course.

MI 360 MOLECULAR GENETICS OF BACTERIA. (3)
This course will cover topics of critical importance for understanding modern bacterial genetics. The course content will include the study of DNA elements including the chromosome, plasmids and bacteriophage, gene expression at the transcriptional, translational and post-translational levels, methods of genetic analysis, transposition, recombination, and the genetics of antibiotic resistance. Incorporated into these topics will be problem solving exercises, discussions of new directions in bacterial genetics, and selected readings in recent applications of bacterial genetics to pathogenesis, development and spread of antibiotic resistance, disease therapy or the study of the human microbiota. Prereq: BIO 208 or BIO 308 or equivalent or consent of instructor.

MI 494G IMMUNOBIOLOGY. (3)
A survey of theories and mechanisms of immunity, including: nature of antigens and antibodies, antigen-antibody reactions, immunocompetent cells, immunogenetics, allergic reactions, tumor immunology and transplantation immunology. Prereq: BCH 401G (may be taken concurrently) and BIO 208 or BIO 308 or consent of instructor. (Same as BIO 494G.)

*MI 495G BACTERIAL PATHOGENESIS. (3)
This course will examine the pathogenic mechanisms used by bacteria to cause human disease. Bacterial virulence factors & host susceptibility factors will be discussed, with an emphasis on understanding the techniques that can be used to identify these traits in newly emerging pathogens. Prereq: BIO 308 or permission of the instructor. MI 360, BIO 315, BCH 401 recommended. (Same as BIO 495G.)

MI 496G TUMOR IMMUNOLOGY AND IMMUNOTHERAPY. (3)
Immunotherapy, the application of immunologic principles to the clinic, often called “Bench to Bedside”, has led to significant objective clinical responses and prolonged time to tumor progression or recurrence in a subset of cancer patients. The current class will discuss basic immunologic principles and show how they apply to the tumor setting. In addition, the class will demonstrate how immunologic mechanisms can be exploited in the treatment of cancer. The semester will be divided into three stages including: 1. A concise review of basic immunology concepts preparing the student for applying those concepts to the tumor setting, 2. a detailed examination of the tumor microenvironment, tumor derived immunosuppression and the effector function of both soluble and cellular mechanisms against tumors of varying stages and 3. a broad overview of immunotherapy including regulatory issues pertaining to reagent development and delivery as well as an in depth review of all of the different approaches utilized to treat cancer since 1980. The course will be lecture based utilizing current and historic literature as well as the Course Directors extensive experience in the field. Prereq: MI 494G or MI 685.

MI 582 VIROLOGY. (3)
Physical, chemical and biological properties of viruses. Modes of replication and control of gene product formation displayed by representative plant, animal, and bacterial viruses. Prereq: BIO 304 and biochemistry or equivalent strongly recommended, or consent of instructor. (Same as BIO 582.)

MI 595 IMMUNOBIOLOGY LABORATORY. (2)
Laboratory in immunology and serology. Preparation, standardization, and uses of biological products; serology. Laboratory; four hours. Prereq: BIO/MI 494G or concurrently; or consent of instructor. (Same as BIO 595.)

MI 598 CLINICAL MICROBIOLOGY. (3)
An introduction to the concepts of clinical microbiology through a survey of the microbial diseases of man using an organ system approach. Prereq: BIO 208 and 209, BIO 476G recommended, CHE 230 or 236, or consent of instructor. (Same as PAT 598.)

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MI 601 SPECIAL TOPICS IN MOLECULAR AND CELLULAR GENETICS. (1)
Each semester five distinguished scientists visit the UK campus to deliver a series of three formal lectures each and participate in numerous informal contacts with graduate students. The emphasis is on the presentation of the most current advances (often unpublished) in selected topics in molecular and cellular genetics. May be repeated to a maximum of six credits. (Same as BCH/BIO/PLS/PPA 601.)

MI 615 MOLECULAR BIOLOGY. (3)
This course will develop the student's ability to critically read and evaluate the primary literature in selected areas of molecular biology; various experimental systems and techniques are discussed. While there is some lecture, the time will be predominately spent in class discussions of the primary literature. Prereq: An advanced course in molecular biology and genetics (e.g. IBS 602) or consent of instructor. (Same as BCH/BIO 615.)

MI 616 BIOLOGY AND THERAPY OF CANCER. (3)
Biology of cancer will be discussed at the molecular, cellular and organismic level. Emphasis will be placed on cellular signaling, genomic instability, apoptosis and cell cycle pathways unique to cancer cells that affect tumor cell behavior and its interactions with the host immune system. The biology of hematopoitic cells will also be included. Clinicians active in treatment and research of various types of cancer will be invited to participate in the lectures. Prereq: IBS 601, IBS 602, and/or IBS 603 (or comparable course in biochemistry, molecular biology or cell biology) or otherwise by consent of course director. (Same as MED/PHA/TOX 616.)

MI 685 IMMUNOBIOLOGY, INFECTION AND INFLAMMATION. (3)
An introductory level graduate course surveying current trends in immunology including the organization of the immune system, cells important for immunity and inflammation; types of immune responses, cellular immunology, molecular immunology, self-nonself discrimination, vaccines and immune mediated diseases. Prereq: BCH 401G, or BCH 501 or 502, IBS 501 or equivalent or consent of the course director. (Same as BIO 685.)

MI 707 CONTEMPORARY TOPICS IN IMMUNOLOGY. (3)
This course will deal with controversial and evolving areas of immunology. Lectures in a given topic will be accompanied by student discussion of contemporary literature. Prereq: MI 685 or equivalent or consent of instructor. (Same as BIO 707.)

MI 710 SPECIAL TOPICS IN MICROBIOLOGY. (2)
A variety of topics relating to modern molecular and cell biology. Prereq: Consent of instructor.

MI 720 MICROBIAL STRUCTURE AND FUNCTION. (3)
Molecular basis of structure and function in unicellular microbes. Molecular genetic and structural approaches to the analysis of bacterial architecture growth, division, and differentiation. Prereq: (to reflect appropriate IBS course). (Same as BIO 720 and OBI 720).

MI 725 MECHANICS OF MICROBIAL PATHOGENESIS. (3)
Mechanisms of Microbial Pathogenesis is designed to cover major pathogenic mechanisms of bacteria, protozoa, fungi and viruses. Since it is impossible to include every possible pathogen, we instead focus on selected pathogens that illustrate particular lifestyles and pathogenic strategies. Emphasis is given to covering host mechanisms that combat the different weapons and lifestyles of the disease causing microbes. Students will gain an understanding of the interplay between pathogen and host and appreciate the myriad ways in which microbes have learned to subvert host pathways and evade the immune system. The course starts with an introduction to pathogenic concepts and immune responses, and then proceeds to the selected pathogens, including Listeria, Chlamydia, Mycobacterium, Toxoplasma, Ebola, Influenza, and HIV. The course is a mixture of lecture and discussion. Students will read current literature, assigned by their instructors, and participate in classroom discussions of the papers. Prereq: MI 720 or MI 495G.

MI 748 MASTER'S THESIS RESEARCH. (0)
Half-time to full-time work on thesis. May be repeated to a maximum of six semesters. Prereq: All course work toward the degree must be completed.

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MI 749 DISSERTATION RESEARCH. (0)
Half-time to full-time work on dissertation. May be repeated to a maximum of six semesters. Prereq: Registration for two full-time semesters of 769 residence credit following the successful completion of the qualifying exams. (Same as MB 749.)

MI 767 DISSERTATION RESIDENCY CREDIT. (2)
Residency credit for dissertation research after the qualifying examination. Students may register for this course in the semester of the qualifying examination. A minimum of two semesters are required as well as continuous enrollment (Fall and Spring) until the dissertation is completed and defended.

MI 768 RESIDENCE CREDIT FOR MASTER'S DEGREE. (1-6)
May be repeated to a maximum of 12 hours. (Same as MB 768.)

MI 769 RESIDENCE CREDIT FOR THE DOCTOR'S DEGREE. (1-12)
May be repeated indefinitely. (Same as MB 769.)

MI 772 SEMINAR IN MICROBIOLOGY. (0-1)
Review of current literature in microbiology; presentation of papers on work in progress in the department or on assigned topics; reports on meetings of national and international scientific and professional societies and symposia. Required of all graduate students. Two hours per week. May be repeated nine times for a maximum of 10 credits. (Same as BIO 772.)

MI 798 RESEARCH IN MICROBIOLOGY. (1-9)
May be repeated to a maximum of 24 credits. Prereq: Consent of instructor. (Same as BIO 798.)

MI 815 FIRST-YEAR ELECTIVE, MEDICAL MICROBIOLOGY AND IMMUNOLOGY. (1-3)
With the advice and approval of his or her faculty adviser, the first-year student may choose approved electives offered by the Department of Medical Microbiology and Immunology. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the first-year curriculum. Pass-fail only. Prereq: Admission to first year, College of Medicine.

MI 816 CELLULAR STRUCTURE AND FUNCTION/GENETICS. (4)
The course combines small group meetings, lecture, clinical correlations, problem-based learning, and problem-solving sessions in providing an understanding of the relationship of human genetics to human health and disease. Close integration with biochemistry topics provides a better picture of how biochemistry, genetics and molecular biology contribute to normal human development and medicine. Lecture, 20 hours per week. Prereq: Admission to Medical School (first year).

MI 822 IMMUNITY, INFECTION, AND DISEASE. (9)
The course provides basic concepts of immunology and of bacterial, viral, fungal and protozoal biology. It focuses on mechanisms of human immunity, immunologically mediated disease, and pathogenesis in infectious disease. The material covered includes relevant pathology associated with both immunologic and infectious diseases, and a brief summary of infectious diseases from an organ system perspective. Lecture, 20 hours per week. Prereq: Admission to second year of medical curriculum.

MI 825 SECOND-YEAR ELECTIVE, MEDICAL MICROBIOLOGY AND IMMUNOLOGY. (1-4)
With the advice and approval of his or her faculty adviser, the second-year student may choose approved electives offered by the Department of Medical Microbiology and Immunology. The intent is to provide the student an opportunity for exploration and study in an area which supplements and/or complements required course work in the second-year curriculum. Pass-fail only. Prereq: Admission to second-year medical curriculum and approval of adviser.

MI 828 IMMUNITY, INFECTION AND DISEASE FOR THE STUDENT DENTIST. (6)
The course provides basic concepts of immunology and bacterial, viral, fungal and protozoal biology. It focuses on mechanisms of human immunity, immunologically mediated disease, and pathogenesis in infectious disease. The material covered includes relevant pathology associated with both immunologic and infectious diseases, and a summary of infectious diseases from a clinical perspective. Prereq: Enrolled in the DMD curriculum. (Same as OBI 828.)

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MI 850-899 FOURTH-YEAR ELECTIVE FOR MEDICAL STUDENTS. (1-6)

With the advice and approval of the faculty adviser and the Student Progress and Promotions Committee, the fourth-year student may choose approved electives offered by the various departments in the College of Medicine. The intent is to provide the student an opportunity to develop his fund of knowledge and clinical competence. Prereq: Admission to the fourth year, College of Medicine and/or permission of the Student Progress and Promotions Committee.