MICROBIOLOGY AND IMMUNOLOGY (MICR)

MICR 365. Infection and Immunity (Dental Hygiene). 2 Hours.
Semester course; 2 lecture hours. 2 credits. A study of infectious
diseases and the immune system of humans with emphasis on the
distribution properties and roles of pathogenic microorganisms and
the varied responses of the host, with emphasis on oral pathologies.
Principles of prevention, control and chemotherapy of infectious
diseases are major components of the course.

MICR 501. Infection and Immunity (Pharmacy). 4 Hours.
Semester course; 4 lecture hours. 4 credits. Offered to pharmacy
students in the first professional year. Others admitted with permission
of instructor. A course on the fundamentals of microbiology and
immunology with aspects on disease and treatment of interest to
dentistry and pharmacy.

MICR 505. Immunobiology. 3 Hours.
Semester course; 3 lecture hours. 3 credits. Background in cellular
and molecular biology, and biochemistry is recommended. Nondegree-
seeking students admitted with permission of instructor. A survey
of immunobiology as a total host response to foreign agents,
covering the nature of antigens and antibodies, antigen-antibody
reactions, immunocompetent cells, allergic reactions, tumor
immunology, transplantation immunology, immunological diseases and
immunogenetics.

MICR 513. Infection and Immunity (Dentistry). 4 Hours.
Semester course; 4 lecture hours. 4 credits. Offered to dental students in
the first professional year. Others admitted with permission of instructor.
A course on the fundamentals of microbiology and immunology with
aspects on disease and treatment of interest to dentistry and pharmacy.

MICR 515. Principles of Molecular Microbiology. 3 Hours.
Semester course; 3 lecture hours. 3 credits. A comprehensive course
designed to provide the student with a thorough understanding of
microbial physiology, genetics and diversity. Also covered are some
basic concepts in microbial pathogenesis and in applied microbiology.
The course focuses on structural and functional characteristics of
micro-organisms; ecological and physiological diversity of microbes;
growth and control of micro-organisms; genetics of bacteria and viruses;
bacteria as agents of disease; and applications of microbiology.

MICR 605. Prokaryotic Molecular Genetics. 3 Hours.
Semester course; 3 lecture hours. 3 credits. Prerequisites: BIOL 530,
BIOL 531, BIOL 532 and BIOL 533; or BIOL 530 and BIOL 504; or
permission of instructor; MICR 515 or equivalent recommended. A
comprehensive introductory course examining the organization of the
genetic material in bacteria and their viruses and the molecular
mechanisms involved in its maintenance, replication, exchange and
expression. Emphasis will be on experimental approaches integrating
classical and modern methods of genetic analysis with biochemical
studies of genetic regulatory mechanisms.

MICR 607. Techniques in Molecular Biology and Genetics. 2 Hours.
Semester course; 2 lecture hours. 2 credits. Prerequisites: MICR 515
or equivalent; permission of instructor. Designed to give an overview
of the techniques utilized in modern molecular biology. The principles
underlying techniques such as plasmid cloning, RNA and DNA analysis,
PCR, DNA sequencing, mutagenesis, genomic mapping, heterologous
gene expression, CRISPR-mediated genome editing, production and
analysis of recombinant proteins, application of mass spectrometry
and microscopy techniques, and transgenic mouse technology will be
discussed in detail by experts in the field.

MICR 608. Introduction to Microbiology and Immunology Research I. 4
Hours.
Semester course; 4 laboratory hours. 4 credits. Enrollment requires
permission of the instructor. Required of all first-year graduate students.
Introduction to all active research programs in microbiology and
immunology. Rotation of students through faculty laboratories to gain
direct exposure to individual research projects. Graded as Pass/Fail.

MICR 609. Introduction to Microbiology and Immunology Research II. 4
Hours.
Semester course; 4 laboratory hours. 4 credits. Enrollment requires
permission of the instructor. Required of all first-year graduate students.
Introduction to all active research programs in microbiology and
immunology. Rotation of students through faculty laboratories to gain
direct exposure to individual research projects. Graded as Pass/Fail.

MICR 616. Mechanisms of Viral and Parasite Pathogenesis. 3 Hours.
Semester course; 3 lecture hours. 3 credits. A comprehensive
introduction to the basic principles of virology and human parasitology.
Interactions of the infecting agents and hosts will be stressed at the
molecular and cellular level.

MICR 618. Molecular Mechanisms of Microbial Pathogenesis. 3 Hours.
Semester course; 3 lecture hours. 3 credits. Enrollment is restricted to
students who have completed undergraduate-level courses in
microbiology or microbial physiology, immunology, and molecular
genetics. The goals of this comprehensive course are to explore in detail
the virulence mechanisms of microbes and the response of the infected
host. The focus will be on important microbial pathogens.

MICR 653. Advanced Molecular Genetics: Bioinformatics. 3 Hours.
Semester course; 3 lecture hours. 3 credits. Prerequisites: Cell/molecular
biology or permission of instructor. An advanced course on contemporary
bioinformatics. Topics covered include the principles and practice of
DNA, RNA and protein sequence analysis, computational chemistry and
molecular modeling, expression array analysis and pharmacogenomics.
The course includes lectures, reading, computer lab, homework problem
sets and projects. Crosslisted as: BNFO 653.

MICR 684. Molecular Biology of Cancer. 3 Hours.
Semester course; 3 lecture hours. 3 credits. Prerequisite: MICR 515 or
equivalent; or permission of instructor. Advanced graduate-level course
to provide theoretical background to graduate students interested in
cancer research. Emphasis will be placed on experimental approach
integrating classical and modern methods of genetic analysis with
biochemical studies in genetic regulatory mechanisms. The course
includes presentations by students and interactive discussion of the
scientific literature in the area of oncogenesis.
MICR 686. Advanced Immunobiology. 3 Hours.
Semester course; 3 lecture hours. 3 credits. Open primarily to residents, medical students and graduate students with an immunology background such as MICR 505. Lectures, seminars, conferences on basic and clinical immunobiology and literature review on the topic, with more emphasis on methods in immunology research and exercising the ability to communicate the topic verbally. Topics have included tumor immunology, cell interactions in the immune response, genetics of the immune response, mechanisms of host-defense and membrane receptors in immunology and neoplasia.

MICR 690. Microbiology Research Seminar. 1 Hour.
Semester course; 1 lecture hour. 1 credit. Presentation and discussion of research reports and topics of current interest to the departmental seminar or special group seminars.

MICR 691. Special Topics in Microbiology. 1-4 Hours.
Semester course; 1-4 credits. Lectures, tutorial studies, and/or library assignments in selected areas of advanced study not available in other courses or as part of the research training.

MICR 692. Current Topics in Molecular Pathogenesis. 1 Hour.
Semester course; 1 lecture hour. 1 credit. Open to all graduate and certificate students. Presents a forum for the discussion of recent advances in the study of the molecular mechanisms of microbial pathogenesis. Consists of presentations by students, postdoctoral fellows and faculty followed by interactive discussions of the implications of presented work to the study of molecular pathogenesis.

MICR 694. Current Topics in Immunology. 1 Hour.
Semester course; 1 lecture hour. 1 credit. Open to all graduate students. Presents a forum for discussion of the scientific literature in the area of cellular and molecular immunology, focusing on mechanisms involved in the operation and regulation of the vertebrate immune system. Consists of presentations by students and interactive discussions of the implications of presented work to the study of immunology.

MICR 695. Special Topics in Microbiology. 1-4 Hours.
Semester course; 1-4 variable hours. 1-4 credits. Lectures, tutorial studies, library assignments in selected areas of advanced study or specialized laboratory procedures not available in other courses or as part of the research training. Graded as S/U/F.

MICR 697. Directed Research in Microbiology. 1-15 Hours.
Semester course; 1-15 credits. Research leading to the M.S. or Ph.D. degree and elective research projects for other students.