MICROBIOLOGY (MICR)

Courses

MICR 4000. Special Topic. 4 Credit Hours.
This is a self-designed course created by both the student and the
department to cover a specific topic. A Course Approval Form must be
completed along with documentation of the designed course description.

MICR 5025. Eukaryotic Pathogens. 1 Credit Hour.
The course will provide students with the opportunity to gain a basic
comprehensive understanding of parasitology and mycology. The first
part of this course will focus on virulence mechanisms and the host
immune response with respect to a variety of parasites that cause
major human diseases. The second part of this course will cover several
important areas of medical mycology including molecular biology,
diagnostic/epidemiology, mating/phenotypic switching, morphology,
pathogenesis, and antifungal therapies.

MICR 5026. Bacterial Pathogenesis. 1 Credit Hour.
This is an introductory course in microbial pathogenesis focusing on
bacterial pathogens that are important in human disease. Students will
receive a foundation in the basic concepts and experimental approaches
that are crucial for understanding the discipline through directed readings
and didactic instruction. Specific concepts, strategies, and mechanisms
used by human bacterial pathogens to cause disease will be illustrated.

MICR 5027. Immunology. 1 Credit Hour.
MICR 5027 is designed to build on the immunological concepts covered
in MICR 5051 given in the Fall semester and to put those concepts to use
as we focus on understanding the world of the mammalian host response
to infection and on applying fundamental immunological concepts to the
understanding of current immunological research questions in a student-
presentation and in-class discussion format. Prerequisite: MICR 5051.

MICR 5028. Virology. 1 Credit Hour.
This course focuses on the molecular and cellular biology of animal
viruses, and their interactions with host cells. Many of the viruses to
be covered in this course are medically significant or have provided
critical information that has expanded our understanding of cell biology,
immunology, development, and differentiation.

MICR 5029. Building Scientific Thinking Skills. 2 Credit Hours.
The goal of this course is to provide the opportunity for graduate
students to develop critical thinking skills in reading scientific literature,
writing scientific grant proposals and manuscripts, and effectively
communicating their own scientific ideas with peers. The course will be
offered in three consecutive stages. First, each student will be assigned
a scientific article focusing on a topic in the areas of Microbiology and
Immunology and will give a 50 minute review presentation to the class.
The content of the article will be discussed and reframed in the context
of a grant proposal, followed by questions/critiques from fellow students
and faculty members. Second, each student will be guided to develop
a F31-style fellowship proposal on their chosen topic. Students are
encouraged to work with their mentors to develop the proposal focused
on their own research. The writing is expected to complete over the
course of four weeks, after which feedback is provided by peers and
MIMG faculty before a final draft is submitted. Finally, each student
presents an oral mock qualifying exam (QE) defense of his or her final
written proposal to the class and a mock QE committee composed of
MIMG faculty members. This course is different from many other writing
courses because it is designed to achieve multiple purposes: 1. Since the
proposal writing and defense portions mimic the process involved in the
MIM discipline QE with MIMG faculty, this course will serve as a practice
for the QE (though all MIM students must write an entirely original QE
proposal for actual QE); 2. Since the scientific proposal is fully spelled
out and written in the format for F31 fellowship application, the student
may use the same proposal for his/her F31 application; 3. Since the
proposal focuses on the research of the thesis project, the discussions/
critiques from the class will help the student to evaluate the feasibility
and significance of his or her potential thesis project before investing too
much into the project; 4. Finally, the three stages of this course have a
long lasting impact on scientific skill development.

MICR 5031. Pathogenic Microbiology. 3 Credit Hours.
This lecture-only course integrates different disciplines (immunology,
cell biology, genetics, biochemistry, molecular biology, physiology,
and medical microbiology) with a central theme focused on molecular
mechanisms of microbial pathogenesis in humans. Recommended
prerequisites for this course are Biochemistry and Molecular Biology.

MICR 5035. Emerging Trends in Immunology and Infection. 2 Credit
Hours.
An intense and advanced exploration of the primary literature focusing
on the latest emerging trends in immunological research. The format
will allow students to develop skills of in depth critical analysis and
will involve a combination of student presentations of current data and
discussions of the historical development and evolution of new directions
in immunological research.

MICR 5051. Intro To Immunology. 2 Credit Hours.
This course is a study of immune responses with emphasis on
experimental strategies for elucidating cellular and molecular
mechanisms. Three phases of study: (1) immunochemistry and molecular
biology of antibodies, lymphocyte receptors, and products of the major
histocompatibility complex; (2) cellular interactions and immuno-
regulation; and (3) immunopathologies (hypersensitivity, autoimmunity,
immunodeficiency, transplantation rejection, and tumor immunology).
Prerequisites: consent of instructor, courses in General Biology and
Genetics recommended.
MICR 5090. Research Progress Report. 1 Credit Hour.
This course allows students to present a progress report on their
research project in a formal setting. Students present a 50-minute
seminar to members of the Molecular Immunology & Microbiology
Discipline and the Department of Microbiology, Immunology and
Molecular Genetics. Students are challenged to think independently and
critically through practice of asking and answering critical questions as
they organize their presentation, and they evaluate each other’s research
findings. This course serves as a mechanism for the students to develop
and practice oral presentation skills in a friendly environment, learn
to explain experimental rationale, scientific methods, results and their
significance to colleagues. Research Progress Report (RPR) serves as
a vehicle to encourage student productivity within the laboratory. The
seminars are videotaped for review by the presenters.

MICR 5091. Current Topics in Microbiology and Immunology. 0.5-3 Credit Hours.
Students will be given an opportunity to gain in-depth understanding of
selected topics in microbiology and immunology through a combination
of library research and discussion with faculty. Prerequisites: consent of
instructor.

MICR 5092. Special Problems. 1-9 Credit Hours.
The course provides an opportunity for the student to engage in a special
research project or to develop proficiency in the use of certain laboratory
methods. Prerequisites: consent of instructor.

MICR 5095. Current Topics in Immunobiology and Host-microbe
Interactions. 1 Credit Hour.
This course is designed to enhance and expand on the existing Research
Progress Report (RPR) course (MICR 5090) that is required of all graduate
students in the Molecular Immunology & Microbiology discipline of the
IBMS Graduate Program. Although the RPR course allows students to
gain experience with regard to making formal lecture presentations
of their research, it is limited in that students present their work only
once a year, the opportunity for full discussion is limited by the time
available after presentations, and being a course in which participants
are exclusively students, there are no opportunities to observe examples of
how skilled seasoned investigators (i.e., faculty and postdoctoral
fellows) present their work. In the currently proposed course, graduate
students will not only have more frequent opportunities to present their
own research and receive vital feedback and critiques, but will also
hear and critique presentations by more senior investigators regarding
projects performed in labs throughout the Department of Microbiology,
Immunology & Molecular Genetics. Prerequisites: MICR 5090.

MICR 6026. Advanced Molecular Genetics of Eukaryotic Pathogens. 2
Credit Hours.
This course will cover the major research methods and techniques used
to study human fungal pathogens.

MICR 6030. The Microbiome & The Associated Metabolites in Health and
Diseases. 2.5 Credit Hours.
This course provides an overview on the role of the microbiome and the
associated metabolites in human health and diseases. It will focus on
clarifying the conceptual framework for understanding how microbiome
and the associated metabolites, particularly gut microbiome, impact
human health and well-being. The course will also introduce students
to the technologies and approaches used to study the microbiome and
the associated metabolites in human and murine models. Prerequisites:
MICR 5051 Open for Cross Enrollment on Space Available Basis.

MICR 6043. Advanced Topics in Virology. 2 Credit Hours.
This course is an in-depth study of selected topics in animal virology at
the molecular level. Prerequisites: consent of instructor.

MICR 6050. Advanced Topics in Tumor Immunology. 1 Credit Hour.
This course provides an opportunity for students to gain a solid
foundation in modern tumor immunology. Topics include tumor antigens,
autoimmunity, mechanisms of killing, dysregulation of inflammation, and
counter measures mediated by tumor to thwart or subvert host immunity.

MICR 6052. Advanced Immunobiology. 3 Credit Hours.
MICR 6052 is composed of 2 separate Modules that are designed to
build on the immunological concepts covered in IBMS 5000 given in
the Fall semester and to put those concepts to use as we focus on
understanding the world of the mammalian host response to infection.
In addition, students will gain a more detailed understanding of the
current concepts, approaches, and applications of research in the field
of immunology. Module 1 is devoted entirely to understanding fundamental
concepts in immunology primarily through lectures and including some
in-class discussion. Module 2 is focused on applying fundamental
immunological concepts to the understanding of current immunological
research questions in a student-presentation and in-class discussion
format. Prerequisites: IBMS 5000 or consent of instructor. Open for Cross
Enrollment on Space Available Basis.

MICR 6071. Supervised Teaching. 1-9 Credit Hours.
This course consists of teaching under the close supervision of
instructors as laboratory assistants and as leaders in tutorial or review
sessions. The more advanced students may present formal lectures in
the classroom or lead discussions in the laboratory. Prerequisites:
consent of chair or department.

MICR 6097. Research. 1-12 Credit Hours.
This course consists of independent, original research under the direction
of faculty advisor. May be conducted in bacteriology, virology, mycology,
parasitology, and immunology.

MICR 6098. Thesis. 1-12 Credit Hours.
Registration for at least one term is required of M.S. candidates.
Admission to candidacy for the Master of Science degree is required.

MICR 6099. Dissertation. 1-12 Credit Hours.
Registration for at least two terms is required of Ph.D. candidates. In
addition, Ph.D. candidates may be required to complete a course in
Biostatistics. Prerequisites: Admission to candidacy for the Doctor of
Philosophy degree.