Microbiology and Immunology

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Undergraduate major: microbiology (B.S.)
Undergraduate minor: microbiology
Graduate degrees: M.S. in microbiology; Ph.D. in microbiology
Faculty: https://medicine.uiowa.edu/microbiology/people-0
Website: https://medicine.uiowa.edu/microbiology/

Courses

Microbiology and Immunology Courses

MICR:2157 General Microbiology 3 s.h.
- Principles of bacterial and viral diversity, structure, genetics, physiology, and metabolism in contexts of molecular biology, immunology, infectious disease, and environmental microbiology. Prerequisites: BIOL:1411 and CHEM:1110.

MICR:2158 General Microbiology Laboratory 2 s.h.
- Practice of basic techniques commonly used today for study of easy-to-grow microorganisms; variety of individual and group lab activities that challenge students to apply observations about bacteria and viruses. Corequisites: MICR:2157, if not taken as a prerequisite.

MICR:3145 Honors in Microbiology Thesis Preparation 1 s.h.
- Guidance and constructive criticism on written and oral presentation of honors research project; submission of thesis introduction; multiple presentations and updates of research project in preparation for final oral presentation at departmental Undergraduate Research Symposium; for honors in the major students and taken final semester before graduation. Prerequisites: MICR:4171.

MICR:3147 Immunology and Human Disease 3 s.h.
- Important principles and key concepts in immunology with a focus on the involvement of the immune system in disease pathogenesis; overview of innate and adaptive immune systems and their functions at cellular and molecular levels. Prerequisites: BIOL:1411 with a minimum grade of C and BIOL:1412 with a minimum grade of C.

MICR:3150 Eukaryotic Pathogens and Human Disease 2 s.h.
- Foundational understanding of the lifecycle, epidemiology, pathogenesis, diagnosis, and treatment of major eukaryotic pathogens/parasites that cause human disease. Prerequisites: MICR:2157 with a minimum grade of C. Recommendations: genetics, biochemistry, and immunology.

MICR:3159 Bacteria and Human Disease 3 s.h.
- Infection and replication strategies of bacteria with an emphasis on human disease; for students interested in microbiology or other biological sciences, epidemiology, and/or health-related occupations. Prerequisites: MICR:2157 with a minimum grade of C.

MICR:3160 Bacterial Physiology and Cell Biology 2 s.h.
- Bacterial physiology and cell biology with reference to model organisms and adaptations to extreme environments; topics include energy metabolism, growth, cell structure, macromolecular assembly, cell division, microbial development, and microbial interactions; lectures augmented with readings from primary literature to give students a strong foundation in prokaryotic biology and approaches used in modern microbiology research. Prerequisites: (BMB:3110 or BMB:3120) and MICR:2157 with a minimum grade of C.

MICR:3164 Microbiology and Human Health 4 s.h.
- Microbiology for nursing, pharmacy, and pre-health professions. Prerequisites: BIOL:1411 or BIOL:1140 or BIOL:1141.

MICR:3165 Bacteria and Human Disease Laboratory and Discussion 3 s.h.
- Use of bacterial genetics and molecular biology techniques and methodologies to study bacteria which cause human disease; development of skills in data analysis and presentation, reading scientific literature, and writing scientific abstracts; for students interested in microbiology or other biological sciences, epidemiology, and/or health-related occupations. Prerequisites: MICR:2157 with a minimum grade of C and MICR:2158 with a minimum grade of C. Corequisites: MICR:3159 or MICR:3170, if not taken as a prerequisite.

MICR:3168 Viruses and Human Disease 3 s.h.
- Infection and replication strategies of viruses with an emphasis on human disease; for microbiology majors as well as students interested in pre-medicine, biological sciences, epidemiology, and/or other health-related occupations. Prerequisites: MICR:2157 with a minimum grade of C or MICR:2158 with a minimum grade of C. Prerequisites: MICR:3159 or MICR:3170, if not taken as a prerequisite.

MICR:3170 Microbial Genetics 2 s.h.
- Genetics of bacteria and bacteriophages including classical, molecular, and genome-wide approaches. Prerequisites: BIOL:2512 with a minimum grade of C or MICR:2157 with a minimum grade of C.

MICR:3177 Virology Discussion 2 s.h.
- Students read, present, and discuss papers from virology literature that address classic and current issues in virology research. Students will learn how to critically evaluate and present methods and results from virology research papers. Prerequisites: MICR:3168 with a minimum grade of C.

MICR:3178 Virology Laboratory 2 s.h.
- Practical approaches to studying viruses; basic techniques in virology including virus detection, virus growth measurement, and virus genetics; introduction to bioinformatic analysis of virus genomes and infections. Prerequisites: MICR:2157 with a minimum grade of C and MICR:2158 with a minimum grade of C. Corequisites: MICR:3168 (if not taken as a prerequisite).

MICR:4161 Undergraduate Research in Microbiology arr.
- Experimental research under faculty supervision. Prerequisites: BIOL:1411.
MICR:4171 Honors Undergraduate Research in Microbiology  
Experimental research under faculty supervision.  
Prerequisites: BIOL:1411. Requirements: microbiology major,  
junior or senior standing, 3.33 overall g.p.a., and 3.33 g.p.a. in  
microbiology courses.

MICR:4175 Topics in Parasitism  
1 s.h.  
Molecular and immunologic mechanisms by which bacteria,  
viruses, and protozoa cause human diseases; based on  
manuscript readings and/or student presentations.  
Requirements: junior or higher standing in microbiology  
related discipline, and current or prior research in a  
microbiology and immunology laboratory.

MICR:5218 Microscopy for Biomedical Research  
arrr.  
Basic microscopy methods for research including optics,  
preparation, and analysis of biomedicals.  
Prerequisites: BIOL:2723. Same as ACR:5218, BIOL:5218.

MICR:5264 Directed Study in Microbiology  
arrr.  
Advanced-level experimental research or teaching under  
faculty supervision.

MICR:5875 Perspectives in Biocatalysis  
1-3 s.h.  
Applied enzymology, protein design, structure-  
activity relationships, bio sensor technology, microbial  
transformations, biodegradation of environmental pollutants.  
Required: graduate standing in a participating  
department supported by the Predoctoral Training Program  
In Biotechnology. Same as BMB:5875, CBE:5875, CEE:5875,  
CHEM:5875, PHAR:5875.

MICR:6201 Graduate Immunology  
3 s.h.  
Ontogeny, activation, and function of T lymphocytes and B  
lymphocytes; innate immune effector mechanisms; major  
histocompatibility complex; antigen presentation; thymocyte  
positive and negative selection; signaling of T lymphocytes, B  
lymphocytes; emphasis on experimental methods for analysis  
of these processes. Prerequisites: MICR:3147. Requirements:  
for IMMU:6201—college biology, general chemistry, and  
introductory immunology courses; for MICR:6201—courses in  
college biology, genetics, general chemistry, and introductory  
immunology. Recommendations: for IMMU:6201—courses in  
biochemistry and genetics; for MICR:6201—biochemistry  
course. Same as IMMU:6201.

MICR:6240 Graduate Eukaryotic Pathogens and Human Disease  
2 s.h.  
Foundational understanding of the lifecycle, epidemiology,  
pathogenesis, diagnosis, and treatment of major  
eukaryotic pathogens/parasites that cause human disease.  
Recommendations: genetics, biochemistry, and immunology.

MICR:6247 Graduate Immunology and Human Disease  
4 s.h.  
Important principles and key concepts in immunology with a  
focus on the involvement of the immune system in disease  
pathogenesis; overview of innate and adaptive immune  
systems and their functions at cellular and molecular levels;  
learning enhanced by case-based, small-group discussion and  
writing exercises. Same as IMMU:6247.

MICR:6250 Mechanisms of Parasitism Journal Club  
1 s.h.  
Reviews of recent publications in molecular parasitology  
research and thesis research by training grant or journal club  
students; for students pursuing graduate thesis research in  
microbiology or a related discipline. Same as MMED:6250.

MICR:6255 Graduate Experimental Approaches to Molecular Microbiology  
2 s.h.  
Exposure to common experimental approaches through  
examination of primary literature and facilitated discussions  
on application of those approaches to advance scientific  
research. Requirements: microbiology graduate standing.

MICR:6259 Graduate Bacteria and Human Disease  
3 s.h.  
Infection and replication strategies of bacteria with an  
emphasis on human disease; discussion focuses on  
experimental approaches used to study mechanisms of  
disease.

MICR:6260 Graduate Bacterial Physiology and Cell Biology  
2 s.h.  
Bacterial physiology and cell biology with reference to  
model organisms and adaptations to extreme environments;  
topics include energy metabolism, growth, cell structure,  
macromolecular assembly, cell division, microbial  
development, and microbial interactions; lectures augmented  
with readings from primary literature to give students a strong  
foundatio in prokaryotic biology and approaches used in  
modern microbiology research.

MICR:6265 Introduction to Grant Writing  
2 s.h.  
How to think and write like scientists and become familiar with  
the elements of a research proposal; writing a grant proposal  
modeled on a National Institutes of Health Exploratory/  
Developmental Research Grant Award (NIH R21); students  
critique proposals written by other students; faculty read  
proposals and provide constructive criticism; lectures describe  
elements of a grant proposal and strategies for effective  
writing. Requirements: enrollment in microbiology graduate  
program, or enrollment in a graduate program training in a  
immunology and microbiology laboratory, or enrollment in a biological science graduate program and  
not working in a microbiology and immunology laboratory  
for thesis project.

MICR:6267 Graduate Viruses and Human Disease  
4 s.h.  
Infection and replication strategies of viruses with an  
emphasis on human disease; discussion focuses on topics  
and techniques used in primary literature and development of  
specific aims for a mini-proposal.

MICR:6268 Biology and Pathogenesis of Viruses  
2 s.h.  
Molecular biology of animal DNA and RNA viruses, viral  
immunology and pathogenesis, and interaction of these  
viruses with eucaryotic cells; mechanisms of viral latency,  
persistence, cellular transformation, oncogenesis; virology  
literature. Prerequisites: MICR:3168 or MICR:6267.

MICR:6269 Graduate Virology Discussion  
1 s.h.  
Discussion of primary virology literature from a range of  
topics, may include techniques used for studying viruses,  
viral entry and replication, evasion of immune responses by  
viruses, vaccines, and viral pathogenesis; short presentations;  
development of specific aims for a mock grant proposal on  
a virology-related topic. Recommendations: completion of a  
virology course.

MICR:6270 Graduate Microbial Genetics  
2 s.h.  
Genetics of bacteria and bacteriophages including classical,  
molecular, and genome-wide approaches.

MICR:7207 Advanced Topics in Immunology  
3 s.h.  
In-depth analysis of selected areas. Prerequisites: IMMU:6201  
or MICR:6201. Same as IMMU:7221.

MICR:7261 Graduate Research in Microbiology  
arrr.  
Requirements: microbiology graduate standing.
MICR:7263 Graduate Student Research Seminar  1 s.h.
Presentation of thesis work in progress. Requirements:
microbiology graduate standing.

MICR:7265 Topics in Virology Literature  1 s.h.
Papers of current interest in primary virology literature.

MICR:8230 Dental Microbiology  3 s.h.
Medical microbiology: bacteriology, immunology, pathogenic
bacteriology, virology, mycology, parasitology. Requirements:
D.D.S. enrollment.