

**851 Immunology**  
Fall of odd 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 851

Functional aspects of immune responses; synthesis, structure, and function of effector molecules; cell-cell interactions; current advances and research techniques.

**855 Molecular Evolution: Principles and Techniques**  
Fall of odd years. 3(3-0) Interdepartmental with Zoology; Plant Biology. Administered by Department of Zoology. RB: (ZOL 341 or ZOL 445)

Current techniques used to characterize and compare genes and genomes. Genetic variation, assays of variation. Data analysis and computer use to conduct a phylogenetic analysis to compare organisms and infer relationships.

**861 Advanced Microbial Pathogenesis**  
Spring of odd years. 3(3-0) RB: (MMG 461 or MMG 409)

Molecular basis of microbial virulence. Virulence factors of microorganisms and the relationship of these factors to disease; host-pathogen interactions.

**890 Special Problems in Microbiology**  
Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 8 credits in all enrollments for this course. R: Open only to graduate students in the Colleges of Human Medicine, Osteopathic Medicine, Veterinary Medicine, Natural Science, and Agriculture and Natural Resources. Approval of department. SA: MPH 890

Individualized laboratory or library research.

**892 Seminar**  
Fall, Spring. 1(1-0) A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to graduate students in College of Agriculture and Natural Resources, College of Engineering, College of Human Medicine, College of Natural Science, College of Osteopathic Medicine, or College of Veterinary Medicine. SA: MPH 892

Student review and presentation of selected topics in microbiology and public health.

**899 Master's Thesis Research**  
Fall, Spring, Summer. 1 to 12 credits. A student may earn a maximum of 36 credits in all enrollments for this course. R: Open only to graduate students in Microbiology and Public Health. SA: MPH 899

Master's thesis research.

**991 Topics in Microbiology**  
Fall, Spring. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. SA: MPH 991

Topics are selected from traditional subdisciplines such as bacteriology, virology, cell biology, and immunology or from transecting subdisciplines such as microbial genetics, physiology, molecular biology and ecology.

**999 Doctoral Dissertation Research**  
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 120 credits in all enrollments for this course. R: Open only to graduate students in Microbiology and Molecular Genetics. SA: MPH 999

Doctoral dissertation research.

## 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 noncommissioned 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**  
Spring. 1(1-2) SA: MS 201 Not open to students with credit in MS 201A.

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.

**220 Challenges in Army Leadership**  
Spring. 1 to 2 credits. RB: (MS 201A or MS 201B) Not open to students with credit in MS 202A or MS 202B.

Application of military case studies. Recognizing challenging situations for military leaders and units. Applying sound ethical leadership practices to implement decisions. Understanding basic military small unit tactics.

**310 Leading and Problem Solving in Army Units**  
Fall. 3 to 4 credits. RB: (MS 101B or MS 110) and (MS 120) and (MS 201B or MS 210) and (MS 220) Completion of basic training, or the leader training course. SA: MS 301

Planning and executing military activities in small Army units. Recognizing and analyzing problems in challenging situations. Implementing the skills required to communicate decisions and supervise subordinates. Applying fundamentals of map reading and land navigation.

**320 Army Small Unit Tactics and Leadership**  
Spring. 3 to 4 credits. RB: (MS 310) SA: MS 302

Fundamentals of military tactics and battle drills. Applying troop leading procedures to military tactical operations. Implementing tactical skills and making decisions to lead small Army units on the battlefield. Integrate terrain analysis into military planning and operations.

**410 Adaptive Army Leadership**  
Fall. 3 to 4 credits. RB: (MS 320) SA: MS 401

Application of military case studies. Skills and attributes military leaders use to make decisions in combat situations. Practical exercises in problem solving and crisis counseling. Fundamentals of Army Training Management, the military justice system, and the law of land warfare.

**420 Army Leadership in a Complex World**  
Spring. 3 to 4 credits. RB: (MS 410) SA: MS 402

Application of military case studies to the principles of the law of land warfare, and rules of engagement in the face of international terrorism. Importance of ethics in military leadership. Integration of the media into military operations. Evaluation of interaction with non-governmental organizations, civilians, and host nation support on the battlefield.

**490 Independent Study in Military Science**  
Fall, Spring. 1 to 4 credits. A student may earn a maximum of 4 credits in all enrollments for this course. R: Open only to juniors or seniors. Approval of department.

Individual research in areas related to military science.

## 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.