

440. Food Microbiology

Spring. 5(3-4) MPH 200 or MPH 301 or approval of department. Interdepartmental with and administered by Food Science.

Major groups of microorganisms of importance to the food industry are studied with emphasis on ecological, physiological, and public health aspects.

442. Soil Microbiology

Spring. 3(3-0) MPH 200 or MPH 301. Interdepartmental with the Department of Crop and Soil Sciences.

Major groups of microorganisms of importance in soils are studied with emphasis on ecological, biochemical, and physical aspects.

444. Environmental Microbiology

Spring. 3(2-4) MPH 200 or MPH 301.

Flora, methods of testing, and purification of environmental air and water. Treatment and disposal of sewage.

IDC. Biological Membranes

For course descriptions, see Interdisciplinary Courses.

490. Special Problems in Microbiology

Fall, Winter, Spring, Summer. 1 to 6 credits. May reenroll for a maximum of 12 credits. Approval of department.

Tutorial instruction in laboratory or library research for advanced undergraduates.

511. Medical Microbiology and Immunology

Spring. 1 to 6 credits. May reenroll for a maximum of 6 credits. A biochemistry course. Enrollment in College of Human Medicine or approval of department.

Basic principles of microbiology (bacteriology, virology, mycology and parasitology) and immunology. Selected type-infections relate these principles to disease in man.

512. Infectious Diseases

Fall. 4(3-3) MPH 511, or approval of department. Interdepartmental with the Department of Medicine.

Infectious diseases of man, including biology of the causative microorganism, epidemiology, pathogenesis, host-parasite relationships, clinical and laboratory diagnosis, and clinical management.

521. Medical Microbiology and Immunology

Winter. Variable credit. May reenroll for a maximum of 6 credits. A biochemistry course. Enrollment in College of Osteopathic Medicine or approval of department.

Basic principles of microbiology (bacteriology, virology, mycology and parasitology) and immunology. Selected type-infections relate these principles to disease in man.

531A. Medical Microbiology: Immunology

Winter. 4(3-2) Second-term Veterinary Medicine students or approval of department.

Basic principles of immunology (immunobiology and immunochemistry) and their relation to disease in animals.

531B. Medical Microbiology: Bacteriology and Mycology

Spring. 5(3-6) Third-term Veterinary Medicine students or approval of department.

Basic principles of bacteriology and mycology and their relation to disease in animals.

531C. Medical Microbiology: Virology

Fall. 3(2-2) Fourth-term Veterinary Medicine students or approval of department.

General properties of animal viruses; pathogenesis, immune response and immunopathology in viral diseases; principles of clinical virology.

531D. Medical Microbiology: Parasitology

Winter. 4(3-3) Fifth-term Veterinary Medicine students or approval of department.

Basic principles of parasitology (protozoology, helminthology, and entomology) and their relation to disease in animals.

618. Infectious Disease Clerkship

Fall, Winter, Spring, Summer. 1 to 17 credits. May reenroll for a maximum of 34 credits. H M 602 and MED 608 or H D 608. Interdepartmental with and administered by the Department of Medicine.

The clerkship emphasizes acquisition in depth of knowledge and skills essential in solution of clinical problems in infectious and immunologic diseases. Integrated basic science input is afforded through relevant seminars.

800. Seminar

Fall, Winter, Spring, Summer. 1(1-0) May reenroll for a maximum of 9 credits. Approval of department.

810. Topics in Microbiology

Fall, Winter, Spring, Summer. 2 to 4 credits. May reenroll for a maximum of 10 credits if different topic is taken. Approval of department.

Topics will be selected from taxonomic subsciences such as bacteriology, virology, protozoology, mycology, and helminthology; from transecting disciplines such as microbial genetics, immunology, physiology, and ecology.

813. Molecular Virology

Fall. 4(4-0) Background in biochemistry, and approval of department.

Molecular nature and biochemistry of replication of bacterial and animal viruses. Emphasis is on current advances, research concepts, and the role of viruses in molecular biology research.

821. Advanced Microbial Physiology and Genetics

Fall. 4(4-0) MPH 421.

Mechanism and regulation of physiologic and metabolic activities unique to prokaryotes: fermentation, photosynthesis, respiration; autotrophy; micro- and macro-molecular synthesis; cell division; membrane processes; gene transfer, recombination, and DNA repair.

826. Ecology of Animal Parasites

Summer. 3 credits. MPH 416, approval of department. Given at W. K. Kellogg Biological Station.

Interaction of parasitic animals (protozoa, helminths, and arthropods) with their natural environment, including host, biotic and physical aspects.

827. Immunochemistry

Spring. 3(3-0) MPH 427; BCH 452, or ZOL 441, and CEM 383 recommended.

Structure and reactivity of antigens and antibodies; synthesis of immunoglobulins. Emphasis is on current advances and research concepts.

828. Immunochemistry Laboratory

Spring. 2(0-6) MPH 427; MPH 827 or concurrently.

Laboratory based partially on subject matter of MPH 827. Experimental techniques used in immunological assays and immune systems.

829. Host-Parasite Relationships

Fall. 3(3-0) MPH 427, MPH 429 or approval of department.

Pathogenesis and host responses to selected bacterial, parasitic, and fungal pathogens. Emphasis is on current research models which exemplify a variety of host-parasite relationships.

842. Advanced Soil Microbiology

Spring. 3(3-0) MPH 425 or approval of department. Interdepartmental with the Department of Crop and Soil Sciences.

Biochemistry, biology, and community ecology of microorganisms indigenous to soil. Emphasis on current research problems.

843. Soil Microbiology Laboratory

Spring. 2(0-6) MPH 842 concurrently or approval of department. Interdepartmental with the Department of Crop and Soil Sciences.

Fundamental techniques of dealing with microorganisms indigenous to soil. Metabolic activity of microorganisms. Interaction between microorganisms and plants.

890. Special Problems in Microbiology

Fall, Winter, Spring, Summer. 2 to 6 credits. May reenroll for a maximum of 12 credits. Approval of department.

899. Master's Thesis Research

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

900. Topics in Microbiology

Fall, Winter, Spring, Summer. 2(2-0) May reenroll if different topic is taken. Approval of department.

Topics will be selected from taxonomic subsciences such as bacteriology, virology, protozoology, mycology, algology, and helminthology; and from transecting disciplines such as microbial genetics, immunology, physiology, and ecology.

901. Experimental Microbiology

Fall, Winter, Spring, Summer. 3(0-9) May reenroll for a maximum of 9 credits. Approval of department.

Experiments, demonstrations, and discussions of current research programs in various areas of microbiology.

999. Doctoral Dissertation Research

Fall, Winter, Spring, Summer. Variable credit. Approval of department.

MILITARY SCIENCE

M S

All University

041. General Military Science

Application of leadership techniques, the decision making process and staff planning. Military customs and traditions. Students will concurrently enroll in a selected non-Military Science course to fulfill military professional requirements.

**Descriptions – Military Science
of
Courses**

A. Military Traditions--M S I
Winter. 0(0-1) Approval of department.

B. Evolution of Military Leadership--M S II
Fall. 0(0-1) Approval of department or M S II standing. HST 235 concurrently.

C. Military Career Preparation--M S II
Spring. 0(0-1) Approval of department or M S II standing.

D. Advanced Camp Preparation--M S III
Winter. 0(0-1) Approval of department or M S III standing.

E. Military Justice and Unit Administration
Fall. 0(0-1) Approval of department or M S IV standing.

121. Preview of Military Science
Fall, Winter, Spring, Summer. 1(1-0)
Approval of department.

Role of the ROTC officer in the Army. Assists the student in planning a curriculum to satisfy requirements for a commission.

122. Marksmanship and Hunter Safety
Fall, Spring. 1(0-2) M S 121 or approval of department.

Small arms marksmanship and safety. Practical exercises on local firing ranges. Individual basic military marksmanship and the skills necessary to participate in a competitive or recreational shooting program.

221. Fundamentals of Military Art and Tactical Science
Fall. 1(1-0) M S 121, M S 041A, M S 122.

Contemporary military tactical doctrine, operations, principles of modern land warfare; analysis of historical examples, application of current doctrine to hypothetical situations.

223. Terrain Analysis and Land Navigation
Winter, Spring. 2(2-0) M S 121 and approval of department.

Military topographic maps, special maps, map profiles, specifications and uses. Terrain analysis for military tactical operations. Land navigation with the lensatic and Silva compass.

324. Military Teaching
Fall, Winter. 4(4-2) Basic course, approval of department.

Methods of teaching manipulative skills to groups with varying educational backgrounds. Emphasis on determination of entry behavior, progress analysis, testing and test construction. Introduction to current teaching aids. Practical experience in simulated field situations is stressed during laboratory.

325. Military Management
Spring. 4(3-2) M S 324 or approval of department.

Task analysis approach to missions. The subject of tactics is used as a teaching vehicle for the managerial approach to the preparation and execution phases of military operations. Emphasis is placed on physical and moral leadership during the laboratory sections.

426. Military Law
Winter. 4(4-0) Approval of department.

Jurisdiction and responsibility of the Army commander and junior leader in the application of military justice. Implications of Army operations as related to the rules of land warfare.

427. Seminar
Spring. 1(1-0) Approval of department.

Precommissioning orientation stressing current military policies, procedures, customs and trends.

499. Independent Study in Military Science

Fall, Winter, Spring, Summer. 1 to 3 credits. May reenroll for a maximum of 6 credits. Approval of department and Juniors.

Individual research and study in an area related to military science as approved and directed by the Department of Military Science.

MUSIC

College of Arts and Letters

100. Theory Review
Fall, Summer. 2(2-1) For majors who need theory review.
Basic course in fundamentals and ear training.

112. Chamber Music
Fall, Winter, Spring, Summer. 1(1-0)
May reenroll for a maximum of 18 credits. Approval of department.
Performance of works for small ensembles.

118. Band
A. Marching Band
Fall. 1 credit. May reenroll for credit. Membership determined by audition.
The Marching Band participates at football games.

B. Spartan Brass
Winter. 1 credit. May reenroll for credit. Membership determined by audition.
The Spartan Brass participates at basketball games.

C. Concert Band
Fall, Winter, Spring. 1 credit. May reenroll for credit. Membership determined by audition.
Public appearances are scheduled on campus each term.

D. Symphonic Band
Fall, Winter, Spring. 1 credit. May reenroll for credit. Membership determined by audition. A high level of achievement in performing ability is required.
Concerts are scheduled both on and off campus.

E. Wind Ensemble
Fall, Winter, Spring. 1 credit. May reenroll for a maximum of 12 credits. Membership determined by audition. The highest level of performance is required.
Full range of wind literature is performed. Public concerts are presented both on and off campus.

F. Repertory Band
Fall, Winter, Spring, Summer. 1 credit. May reenroll for a maximum of 12 credits. Membership determined by audition.
Public appearances are scheduled on campus each term.

133A. Symphony Orchestra
(133) Fall, Winter, Spring. 1(0-5) May reenroll for a maximum of 12 credits. Admission by audition.

Preparation and performance of symphony and operatic repertoire under direction of faculty and guest conductors of international reputation.

133B. Chamber Orchestra
Fall, Winter, Spring. 1(0-5) May reenroll for a maximum of 12 credits. Membership determined by audition.

A specialized ensemble of advanced performers concentrating on the repertoire of the classic composers, and modern repertoire for chamber orchestra. Rehearsals and performances with faculty and guest artists.

135. Music in Elementary Education
Fall, Winter, Spring, Summer. 4(3-3)
Elementary education majors.

Basis, scope and sequence of music instruction in the elementary schools with an introduction to basic knowledge and skills used in elementary school music.

141. Class Instruments and Voice
Fall. 1(0-2) Knowledge of notation. Music majors, or approval of department.
Class instruction in piano, voice, violin, cello, clarinet, and cornet.

142. Class Instruments and Voice
Winter. 1(0-2) MUS 141.
Continuation of MUS 141.

143. Class Instruments and Voice
Spring. 1(0-2) MUS 142.
Continuation of MUS 142.

145. Music Foundations I
Fall, Winter, Spring. 3(3-0) MUS 135 and approval of department.

Development of understanding and knowledge of music fundamentals, ear training, music reading, rhythm, and other basic music perceptions. Designed specifically for elementary classroom teachers who elect a strong concentration in music.

147. Elementary Piano
Fall, Winter, Spring. 2(2-2) MUS 145 or approval of department. Elementary Education and Physical Education and Recreation majors.

Beginning class piano instruction. Development of ability to play the three principal chords in all keys and to harmonize simple melodies using these chords. Transposition of simple melodies. Ability to play melodies and rhythms suitable for use in lower intermediate grades or in recreation work.

148. Elementary Piano
Winter, Spring. 2(2-2) MUS 147. Elementary Education majors.
Continuation of MUS 147.

150. Keyboard Instruments and Harp
Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 24 credits. Audition required.
Instruction in piano, organ and harp.

151. Voice
Fall, Winter, Spring, Summer. 1 to 4 credits. May reenroll for a maximum of 24 credits. Audition required.