

909. Elastic Thin Shells

Spring. 4(4-0) MMM 815 or C E 804 or approval of department; MTH 421. Interdepartmental with and administered by Civil Engineering.

Elements of differential geometry, membrane theory of shells, Pucher's stress function, deformation and bending of shells of revolution and shallow shells.

911. Theory of Elastic Stability

Fall of odd-numbered years. 4(4-0) MMM 815 or approval of department.

Theory and methods of determining buckling strength and post-buckling behavior of bar, plate and shell elements and of elastic systems.

912. Theory of Plates

Winter. 4(4-0) MMM 815 or C E 804 or approval of department; MTH 422. Interdepartmental with Civil Engineering.

Bending of thin elastic plates with various shapes and boundary conditions; application of energy principles and approximate methods of solution; thick plates; large deflection theory; sandwich plates.

915. Theory of Elasticity II

Spring. 3(3-0) MMM 813 or approval of department.

Saint-Venant bending and torsion. Problems in three-dimensional linear elasticity using the Galerkin vector and Neuber-Papkovich functions.

918. Theory of Viscoelasticity

Fall of even-numbered years. 3(3-0) MMM 810; MTH 422 or approval of department.

Fundamental linear viscoelastic stress-strain relations. Model representation. Three dimensional and general deformation laws. Correspondence principle. Quasi-static, dynamic and buckling problems.

920. Theory of Vibrations II

Winter of odd-numbered years. 4(4-0) MTH 422; M E 823 or approval of department. Interdepartmental with the Department of Mechanical Engineering.

Vibrations of one, two, and three dimensional models of elastic and inelastic continua. Interaction phenomena. Stability. Variational methods. Applications to aeronautics, aerospace, and undersea technology.

921. Theory of Vibrations III

Spring of odd-numbered years, Summer. 4(4-0) MMM 920 or approval of department. Interdepartmental with the Department of Mechanical Engineering.

Nonlinear oscillations. Resonance; subharmonics; self-sustained motions; stability. Methods of Poincare, van der Pol, etc. Random vibrations. Parametric excitations; stochastic processes; power spectra. Applications.

999. Doctoral Dissertation Research

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

200. Elementary Microbiology

Fall, Winter. 4(3-2) Three terms of Natural Science. Primarily for majors outside the College of Natural Science.

Description of bacteria and related forms of microorganisms, their growth and nature, their application in industry, and their control in public health.

234. Elementary Medical Microbiology

Fall. 5(4-4) CEM 130, B S 211, approval of department.

Survey of immunology and microbiology with emphasis on pathogenic microorganisms, antimicrobial agents, and laboratory diagnosis.

301. Introductory Microbiology

Fall, Winter, Spring. 3(3-0) CEM 242, CEM 244 or BCH 200.

Fundamentals of microbiology. Ranges of cell structure and activities; nutrition, growth, and importance of major microbial groups.

302. Introductory Microbiology Laboratory

Fall, Spring. 2(0-4) MPH 301 or concurrently.

Methodology of microbiology including microscopy, staining, asepsis, cultural media and quantification.

303. Microbiology I: General

Fall. 4(4-0) BCH 451 or concurrently.

Principles of microbiology emphasizing cell structure and function, metabolism, growth and death, differentiation, diversity, and microbial interaction.

304. General Microbiology Laboratory I

Fall. 3(1-5) MPH 303 or concurrently.

Techniques and procedures of general microbiology emphasizing the isolation and identification of bacteria, the qualitative aspects of growth and death, and bacterial interactions.

306. General Microbiology Laboratory II

Winter. 3(1-5) MPH 304.

Continuation of MPH 304 with emphasis on immunologic and genetic techniques and procedures.

310. Food Safety and Microbiology

Fall. 4(3-3) Juniors; CEM 132 or concurrently or approval of department. Not open to students with credit in FSC 440. Interdepartmental with and administered by Food Science.

Effects of food handling, preparation and service on food safety. Microorganisms in foods, sanitation, food borne disease and food service regulations.

400H. Honors Research

Fall, Winter, Spring, Summer. 2 credits. May reenroll for a maximum of 8 credits. Approval of department.

A four-term research project with thesis.

405. Microbiology II: Immunobiology/Cell Biology

(427.) Winter. 4(4-0) MPH 303; BCH 452 or concurrently. Students may not receive credit in both MPH 405 and MPH 462.

Cell biology of eukaryotic cells with immune system as model. Emphasize structure-function relationships in subcellular organelles, antigen metabolism and regulatory mechanisms of immune responsiveness.

406. Medical Mycology

Fall, Spring. 4(2-6) BOT 402 or approval of department. Interdepartmental with and administered by the Department of Botany and Plant Pathology.

Characteristics, habits, and laboratory identification of fungus diseases infecting humans. Emphasis on laboratory techniques and morphological characteristics of the various mycoses.

407. Microbiology III: Microbial Genetics

(423.) Spring. 4(4-0) MPH 405; BCH 453 or concurrently.

Genetics and molecular biology of bacteria and viruses with emphasis on the genetic principles developed from their study.

413. Animal Cells and Viruses

Fall. 3(3-0) MPH 407.

Basic features of animal cell structure and function, and of animal viruses as tools to understand eukaryotic gene expression, as pathogens, and as examples of diversity and divergence with cellular mechanisms.

416. General Parasitology

Fall. 3(3-0) B S 210, B S 211, B S 212 or LBS 141.

Life history, host-parasite relationships (including physiology, immunology, immunopathology and pathology) and epidemiology of selected groups and species of protozoan, trematode, cestode and nematode parasites.

417. General Parasitology Laboratory

Fall. 2(0-4) MPH 416 or concurrently or approval of department.

Identification and life histories of representative species of major groups of animal parasites. Selected concepts of host-parasite associations will be tested experimentally.

420. Biology of Animal Parasites

Summer. 6 credits. B S 212 or approval of department. Given at W. K. Kellogg Biological Station. Interdepartmental with the departments of Fisheries and Wildlife, and Zoology.

Parasitism of animals by protozoa, helminths and arthropods with emphasis on the interrelationships of host-parasite associations with the natural environments.

425. Microbial Ecology

Spring. 3(3-0) MPH 301 or approval of department. MPH majors must enroll concurrently in MPH 425A.

Microbial activities in natural ecosystems; their association with plants and animals, and their transformations of carbon, nitrogen and sulfur in soil and aquatic habitats.

425A. Microbial Ecology Recitation

Spring. 1(1-0) MPH 425 concurrently.

Quantitative aspects of microbial ecology.

429. Host-Parasite Relationships

Winter. 3(3-0) MPH 407, MPH 413.

Molecular basis of microbial virulence determinants and their role in overcoming mechanisms of host defense.

437. Introductory Medical Parasitology

Fall. 5(3-5) B S 210, B S 211, B S 212.

Primarily for Medical Technology students.

Biology of protozoan, helminth, and arthropod infections of humans. Laboratory diagnosis of these infections.

MICROBIOLOGY AND PUBLIC HEALTH

MPH

College of Human Medicine
College of Natural Science
College of Osteopathic Medicine
College of Veterinary Medicine

- 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.
- 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.
- 462. Medical Immunology**
Winter. 2(2-0) MPH 301, MPH 302. Students may not receive credit in both MPH 405 and MPH 462. Humoral and cellular immune responses to bacterial antigens.
- 463. Medical Microbiology**
Winter. 2(2-0) MPH 301, MPH 302. Fundamental properties of bacterial pathogens and bacterial disease.
- 464. Medical Microbiology and Immunology Laboratory**
Winter. 2(0-6) MPH 462, MPH 463 or concurrently. Basic immunologic and taxonomic laboratory techniques of selected bacterial pathogens.
- 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.
- 503. Cell Biology**
Fall. 5(5-0) Admission to the College of Human Medicine. Interdepartmental with the departments of Biochemistry, Physiology, and Pharmacology and Toxicology. Principles of cell biology for medical students.
- 511. Medical Microbiology and Immunology**
Fall. 1 to 5 credits. May reenroll for a maximum of 5 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 humans.
- 512. Infectious Diseases**
Winter. 4(3-3) MPH 511, or approval of department. Interdepartmental with the Department of Medicine. Infectious diseases of humans, 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 immunoprophylaxis 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 PHD 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**
Spring. 4(4-0) MPH 421. Mechanism and regulation of physiologic and metabolic activities unique to prokaryotes including fermentation, photosynthesis, respiration and autotrophy.
- 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**
Fall of odd-numbered years. 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**
Fall of odd-numbered years. 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.
- 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.

A. Military Traditions—M S I

Winter. 0(0-1) Approval of department.

B. Advanced Drill and Ceremonies

Spring. 0(0-1) Approval of department or M S II standing.