

Descriptions — Mechanical Engineering of Courses

- 899. Master's Thesis Research**
Fall, Spring, Summer. 1 to 8 credits. A student may earn a maximum of 24 credits in all enrollments for this course.
- 902. Random Vibration of Structural and Mechanical Systems**
Spring of odd-numbered years. 3(3-0) Interdepartmental with Civil Engineering, and Materials Science and Mechanics. Administered by Civil Engineering.
P: CE 802 or ME 860; CE 810.
Probabilistic modeling of random excitations (e.g., earthquake, aerodynamic, and ocean wave loadings). Response of single and multiple degree-of-freedom systems to random excitation. Designing against failure. Nonstationary and nonlinear problems.
- 913. Advanced Heat Conduction**
Fall of even-numbered years. 3(3-0)
P: ME 812 or MTH 849.
Inverse and ill-posed problems in heat transfer: function estimation, regularization, and adjoint methods in conduction.
- 930. Selected Topics in Fluid Mechanics**
Fall. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course.
P: ME 830.
Current topics in fluid mechanics will be presented.
- 934. Application of Turbulence Fundamentals**
Spring. 3(3-0)
P: ME 834.
Fundamental physics of turbulence from dimensional analysis approach. Classical and coherent structure analysis.
- 940. Selected Topics in Thermal Science**
Spring. 1 to 3 credits. A student may earn a maximum of 12 credits in all enrollments for this course.
P: ME 812, ME 814, ME 816. R: Open only to Mechanical Engineering majors.
Conduction, convection, radiation, phase change and interactive combined modes of heat transfer. Mass transfer. Irreversible thermodynamics.
- 952. Advanced Control Systems**
Fall. 3(3-0)
P: ME 852.
Current topics in control theory with potential for improving mechanical systems design.
- 960. Selected Topics in Vibrations**
Fall. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course.
P: ME 860.
Current topics of interest to the student and faculty.
- 963. Wave Phenomena**
Spring of even-numbered years. 3(3-0)
R: Approval of department.
Linear and non-linear waves in bounded and unbounded media. Reflection, refraction, diffraction. Dispersion. Shock and acceleration waves. Waveguides. Acoustical and optical analogies. Fluid and solid continua.
- 971. Intelligent Materials and Smart Structures: Applications**
Fall of odd-numbered years. 3(3-0)
P: ME 873.
Design-for-manufacture issues in smart materials: biomimetics, nanotechnology, electro-rheological fluids, shape memory alloys, piezoelectric materials, fiber-optics, neural networks.

- 990. Independent Study in Mechanical Engineering**
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course.
Individualized study of a current problem in mechanical engineering.
- 999. Doctoral Dissertation Research**
Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 72 credits in all enrollments for this course.

MEDICAL TECHNOLOGY MT

Medical Technology Program College of Natural Science

- 212. Fundamentals of Laboratory Analysis**
Fall. 3(3-0)
P: MTH 103 or MTH 116; CEM 141 and CEM 161.
Chemical, biological and instrumental laboratory analyses: method evaluation, quality assurance, and predictive value theories.
- 213. Application of Clinical Laboratory Principles**
Fall. 1(0-3)
C: MT 212. R: Open only to students in Clinical Laboratory Sciences, and Medical Technology.
Microscopy, pipetting. Specimen collection, handling and processing. Laboratory safety, quality control, and method evaluation.
- 406. Medical Mycology**
Spring. 3(2-3) Interdepartmental with Botany and Plant Pathology, and Microbiology. Administered by Botany and Plant Pathology.
P: BOT 402, MIC 302.
Characteristics and laboratory identification of fungal diseases in humans and other animals. Laboratory techniques. Morphology of causative fungi.
- 414. Clinical Chemistry and Body Fluid Analysis**
Spring. 4(4-0)
P: BCH 401, MT 212, PSL 250; STT 200 or STT 201.
Analytical methods in clinical chemistry and urinalysis. Correlation of laboratory test results with physiology and diseases of renal, hepatic and cardiac systems.
- 415. Clinical Chemistry and Body Fluid Analysis Laboratory**
Spring. 1(0-3)
P: MT 213. C: MT 414. R: Open only to Clinical Laboratory Sciences majors.
Quantitative analysis of blood and body fluids. Spectrophotometry, electrophoresis, chromatography, enzymatic assays, and immunoassays.
- 416. Clinical Chemistry**
Fall. 4(4-0)
P: MT 212, BCH 401.
Analytical methods in clinical chemistry. Correlation of laboratory test results with physiology and diseases of the endocrine system, pregnancy, and cancer. Therapeutic drug monitoring and automation.
- 422. Hematology and Hemostasis**
Fall. 4(4-0)
P: MT 212; BCH 401 or concurrently.
Structure and function of normal blood cells with changes seen in benign and malignant diseases, and in acquired and hereditary diseases.
- 423. Hematology and Hemostasis Laboratory**
Fall. 1(0-3)
P: MT 213. C: MT 422. R: Open only to Clinical Laboratory Sciences majors.
Diagnostic assessment of blood cells and hemostatic function.
- 432. Clinical Immunology and Immunohematology**
Spring. 5(5-0)
P: MT 212.
Cellular and humoral immunity, diseases of immunity. Clinical serology and immunology, blood group serology, and transfusion practices.
- 433. Clinical Immunology and Immunohematology Laboratory**
Spring. 1(0-3)
P: MT 213. C: MT 432. R: Open only to majors in Clinical Laboratory Sciences.
Immunologic methods for disease detection. Methods of blood typing and pre-transfusion testing.
- 442. Education and Management in the Clinical Laboratory**
Fall. 3(3-0)
R: Open only to majors in Clinical Laboratory Sciences.
Concepts of management in clinical laboratory practice. Program accreditation and certification. Government regulation. Personnel recruitment and selection. Performance evaluation. Financial management.
- 454. Problem Solving Across Clinical Laboratory Disciplines (W)**
Spring. 4(4-0)
P: MT 212, MT 213, MT 414, MT 415, MT 416, MT 422, MT 423, MT 432, MT 433, MIC 463, MIC 464. R: Open only to seniors in Clinical Laboratory Sciences. Completion of Tier I writing requirement.
Problem-oriented approach integrates topics from previous courses in clinical laboratory sciences, social sciences, and humanities. Emphasis on published primary research literature and its critical appraisal.
- 455. Integrating Clinical Laboratory Science Discipline (W)**
Spring. 2(2-0)
P: MT 414, MT 416, MT 422, MT 432, MIC 463. R: Open only to seniors in Medical Technology. Completion of Tier I writing requirement.
Problem oriented approach integrating topics from Medical Technology courses with emphasis on writing experience in the major and on critical thinking skills.
- 471. Advanced Clinical Chemistry Laboratory**
Fall, Spring, Summer. 3 credits.
C: MT 472. R: Open only to seniors in Clinical Laboratory Sciences.
Application and integration of theory and technical skills of chemistry and biochemistry.
- 472. Advanced Clinical Chemistry**
Fall, Spring, Summer. 1 credit.
C: MT 471. R: Open only to seniors in Clinical Laboratory Sciences.
Theoretical aspects of clinical chemistry. Chemical and biochemical reactions. Statistical analysis, pathophysiological relationships, and methodologies.
- 473. Advanced Clinical Hematology and Body Fluids Laboratory**
Fall, Spring, Summer. 4 credits.
C: MT 474. R: Open only to seniors in Clinical Laboratory Sciences.
Application of the theory of hematology, hemostasis, and body fluid analysis.

474. Advanced Clinical Hematology and Body Fluids
Fall, Spring, Summer. 1 credit.
C: MT 473. R: Open only to seniors in Clinical Laboratory Sciences.
Theoretical aspects of advanced hematology, hemostasis and body fluid analysis. Integration of cognitive material with test results.

475. Advanced Clinical Immunology and Immunoematology Laboratory
Fall, Spring, Summer. 2 credits.
C: MT 476. R: Open only to seniors in Clinical Laboratory Sciences.
Application of immunology and immunoematology principles.

476. Advanced Clinical Immunology and Immunoematology
Fall, Spring, Summer. 1 credit.
C: MT 475. R: Open only to seniors in Clinical Laboratory Sciences.
Theory of immunology and immunoematology. Integration of cognitive material with test results.

477. Advanced Clinical Microbiology Laboratory
Fall, Spring, Summer. 3 credits.
C: MT 478. R: Open only to seniors in Clinical Laboratory Sciences.
Application of clinical microbiology.

478. Advanced Clinical Microbiology
Fall, Spring, Summer. 1 credit.
C: MT 477. R: Open only to seniors in Clinical Laboratory Sciences.
Theory of clinical microbiology. Integration of cognitive material with laboratory results.

495. Directed Study
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course.
R: Open only to Clinical Laboratory Science and Medical Technology majors.
Faculty directed study including assigned readings, reviews of appropriate scientific periodicals, and research laboratory experience.

801. Medical Technology Seminar
Spring. 1(1-0) A student may earn a maximum of 2 credits in all enrollments for this course.
R: Open only to graduate students in Clinical Laboratory Sciences.
Current research topics in clinical laboratory sciences.

810. Research Planning in the Clinical Laboratory Sciences
Fall of odd-numbered years. 2(2-0)
R: Open only to graduate students in Clinical Laboratory Sciences.
Directed reading and discussions on research methodology and research funding. Written and oral proposal presentations.

812. Advanced Clinical Chemistry
Spring of even-numbered years. 2(2-0) Interdepartmental with Pathology.
P: BCH 462, MT 414, MT 416.
Biochemical basis of selected pathologic conditions including inborn errors of metabolism, endocrine and other genetic disorders. Emphasis on current diagnostic techniques.

820. Advanced Human Hematology
Fall of even-numbered years. 2(2-0) Interdepartmental with Pathology.
P: MT 422.
Selected topics in hematology including pathogenesis, mechanisms and morphological pictures. Emphasis on laboratory tests and interpretation of results.

830. Concepts in Molecular Biology
Spring of odd-numbered years. 2(2-0) Interdepartmental with Pathology.
P: One course in Biochemistry or concurrently.
Techniques and theories of molecular biology, nucleic acid synthesis and isolation, enzymatic digestion and modification, electrophoresis, hybridization, amplification, library construction, and cloning.

840. Advanced Hemostasis
Fall of odd-numbered years. 2(2-0) Interdepartmental with Pathology.
P: BCH 462, MT 422.
Physiology, pathophysiology, and laboratory evaluation of hemostatic disorders.

860. Clinical Laboratory Diagnosis of Infectious Diseases
Spring of even-numbered years. 2(2-0) Interdepartmental with Pathology.
P: MIC 451, MIC 464.
Laboratory techniques for diagnosing infectious diseases in humans. Emphasis on differential diagnosis and correlation of microbiological results with serology, hematology, and clinical chemistry.

890. Selected Problems in Clinical Laboratory Science
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 12 credits in all enrollments for this course.
R: Open only to graduate students in Clinical Laboratory Sciences.
Non-thesis research for Plan B master's students.

899. Master's Thesis Research
Fall, Spring, Summer. 1 to 10 credits. A student may earn a maximum of 24 credits in all enrollments for this course.
R: Open only to graduate students in Clinical Laboratory Sciences.

MEDICINE

Department of Medicine College of Human Medicine

450. Cancer Biology
Spring. 3(3-0) Interdepartmental with Zoology. Administered by Zoology.
P: BCH 200 or BCH 401; ZOL 221.
Cancer biology: cellular and molecular aspects. Applications of modern biotechnology to cancer research. Causes, treatment and prevention of cancer. World distribution and risk factors of cancer.

512. Infectious Diseases
Spring. 4 credits. Interdepartmental with Microbiology.
P: MIC 511 or approval of department. R: Open only to graduate-professional students in College of Human Medicine.
Infectious diseases of humans. Biology of the causative microorganism, epidemiology, pathogenesis, host-parasite relationships. Clinical and laboratory diagnosis, and clinical management.

590. Special Problems in Medicine
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 12 credits in all enrollments for this course.
R: Open only to graduate-professional students in College of Human Medicine.
Supervised work on an experimental, theoretical, or applied problem.

MED

608. Internal Medicine Clerkship
Fall, Spring, Summer. 2 to 18 credits. A student may earn a maximum of 42 credits in all enrollments for this course.
P: FMP 602. R: Open only to graduate-professional students in College of Human Medicine.
Community hospital clerkship. Interviewing skills, history, physical examination. Problem solving and therapy. Care of the whole patient leading to independence in patient management.

609. Hematology Clerkship
Fall, Spring, Summer. 2 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.
P: MED 608. R: Open only to graduate-professional students in College of Human Medicine.
Data collection, problem solving, and management related to common hematologic disorders of children and adults.

610. Oncology Clerkship
Fall, Spring, Summer. 2 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.
P: MED 608. R: Open only to graduate-professional students in College of Human Medicine.
Data collection, problem solving and management of prevalent cancers in children and adults.

611. Cardiology Clerkship
Fall, Spring, Summer. 2 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.
P: MED 608. R: Open only to graduate-professional students in College of Human Medicine.
Evaluation of patients with cardiac diseases. Special diagnostic procedures including cardiac cuticularization, phonocardiography, echocardiography, and electrocardiography.

612. Nephrology Clerkship
Fall, Spring, Summer. 2 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.
P: MED 608. R: Open only to graduate-professional students in College of Human Medicine.
Integrated concepts of renal physiology and pathophysiology of renal disease. Clinical experience.

613. Dermatology Clerkship
Fall, Spring, Summer. 2 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.
P: MED 608. R: Open only to graduate-professional students in College of Human Medicine.
Experience in a dermatologist's office to develop clinical, observational, and diagnostic skills in dermatology.

614. Pulmonary Clerkship
Fall, Spring, Summer. 2 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.
P: MED 608. R: Open only to graduate-professional students in College of Human Medicine.
Pulmonary physiology. Evaluation of pulmonary function. Diagnosis and treatment of common pulmonary diseases.

615. Gastroenterology Clerkship
Fall, Spring, Summer. 2 to 12 credits. A student may earn a maximum of 12 credits in all enrollments for this course.
P: MED 608. R: Open only to graduate-professional students in College of Human Medicine.
Experience with gastrointestinal problems in ambulatory and hospital settings. Emphasis on continuity and comprehensive care.