834. Fundamentals of Turbulence
Spring, 3(0-3) P: ME 451.

836. Experimental Methods in Fluid Mechanics
Fall, 3(1-4) P: ME 452.
Modern techniques of fluid mechanics measurement and data analysis. Pressure, temperature and velocity measurement techniques. Optical diagnostics. QP: ME 333

852. Intermediate Control Systems
Spring, 3(0-3) P: ME 451.
Design of controllers for dynamic systems in mechanical engineering. Modeling, analysis and simulation. QP: ME 456 QA: ME 832

883. Nonlinear Vibrations
Spring, 3(0-3) P: ME 461.

875. Optimal Design of Mechanical Systems
Spring, 3(0-3) P: ME 461.

913. Advanced Heat Conduction
Fall of even-numbered years, 3(0-3) P: ME 812 or MTH 849.
Inverse and ill-posed problems in heat transfer: function estimation, regularization, adjoint methods, numerical methods in conduction. Moving boundaries, phase change, Green's functions and integral transforms. QP: ME 817, MTH 826, MTH 841 QA: ME 917

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. QP: ME 830.
Current topics in fluid mechanics will be presented. QP: ME 841

934. Application of Turbulence Fundamentals
Spring, 3(0-3) P: ME 834.
Fundamental physics of turbulence from dimensional analysis approach. Classical and coherent structure analysis. QP: ME 333 QA: ME 843

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. QP: ME 812, ME 814, ME 816.
Conduction, convection, radiation, phase change and interactive combined modes of heat transfer. Mass transfer, irreversible thermodynamics. QP: ME 813, ME 814, ME 817 QA: ME 980

952. Advanced Control Systems
Fall, 3(0-3) P: ME 852.
Current topics in control theory with potential for improving mechanical systems design. QP: ME 852

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. QP: ME 860.
Current topics of interest to the student and faculty. QP: ME 852

963. Wave Phenomena
Spring of odd-numbered years, 3(0-3) R: Approval of department.

971. Intelligent Materials and Smart Structures: Applications
Fall of odd-numbered years, 3(0-3) P: ME 873.

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. QA: ME 925

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. QA: ME 990

MEDICAL TECHNOLOGY—Descriptions of Courses

Medical Technology MT
Medical Technology Program
College of Natural Science

212. Fundamentals of Laboratory Analysis
Fall, 3(0-3) P: MTH 105 or MTH 116, CEM 141 and CEM 161.
C: MT 213
Chemical, biological and instrumental laboratory analyses; method evaluation, quality assurance, and predictive value theories. QP: MTH 109 or MTH 111, CEM 142 QA: MT 210, MT 110

213. Application of Clinical Laboratory Principles
Fall, 1(0-3) C: MT 212
Microscopy, pipetting. Specimen collection, handling and processing. Laboratory safety, quality control, and method evaluation. QA: MT 211

414. Clinical Chemistry and Body Fluid Analysis
Spring, 3(1-4) P: BCH 401, MT 212, PSL 250; SIT 200 or SIT 201.
Analytical methods in clinical chemistry and urinalysis. Corrective and laboratory test results with physiology and diseases of renal, hepatic and cardiac systems. QP: PSL 241, MT 210, BCH 401 QA: MT 300, MT 440
415. Clinical Chemistry and Body Fluid Analysis Laboratory
Spring, Fall; MT 219, C; MT 411 R: Open only to Clinical Laboratory Sciences majors.
Quantitative analysis of blood and body fluids. Spectrophotometry, electrophoresis, chromatography, enzymatic assays, and immunoassays.
QA: MT 401, MT 441

416. Clinical Chemistry
Fall, 4(4-0)
P: MT 212, BCH 401, 401.
Analytical methods in clinical chemistry. Correlation of laboratory test results with physiology and diseases of the endocrine system, pregnancy, and cancer. Therapeutic and preventive implications of laboratory test results with physiology and diseases of the endocrine system, pregnancy, and cancer. Therapeutic and preventive implications of hormone levels, pregnancy, and cancer.
QA: MT 412, MT 410

422. Hematology and Hemosynthesis
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.
QA: MT 210 QA: MT 420, MT 449

432. Clinical Immunology and Immunohematology Laboratory
Spring, 5(5-0)
P: MT 212; C; MT 422 R: Open only to Clinical Laboratory Sciences majors.
Diagnostic assessment of blood cells and hematologic function.
QA: MT 421, MT 441

433. Clinical Immunology and Immunohematology Laboratory
Spring, 10(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.
QA: MT 430, QA: MT 448

442. Education and Management in the Clinical Laboratory
Fall, 3(3-0)
R: Open only to majors in Clinical Laboratory Sciences.
QA: MT 400, ACC 236, PSY 255

454. Problem Solving Across Clinical Laboratory Disciplines
Spring, 4(4-0)
P: MT 212, MT 219, MT 411, MT 415, MT 416, MT 422, MT 432, MT 433, MT 439, MPH 463, MPH 464.
R: Open only to seniors in Clinical Laboratory Sciences.
Problem-oriented approach integrates topics from previous coursework in clinical laboratory sciences, social sciences, and humanities. Emphasis on published primary research literature and its critical appraisal.
QA: MT 451, MT 462, MT 463

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.
QA: MT 481

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, pathophysiologic relationships, and methodologies.
QA: MT 481

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.
QA: MT 482, MT 466, MT 487

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.
QA: MT 482, MT 487

475. Advanced Clinical Immunology and Immunohematology Laboratory
Fall, Spring, Summer. 2 credits.
C: MT 476 R: Open only to seniors in Clinical Laboratory Sciences.
Application of immunology and immunohematology principles.
QA: MT 483, MT 485

476. Advanced Clinical Immunology and Immunohematology
Fall, Spring, Summer. 1 credit.
C: MT 475 R: Open only to seniors in Clinical Laboratory Sciences.
Theory of immunology and immunohematology. Integration of cognitive material with test results.
QA: MT 484, MT 485

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. QA: MT 484

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.
QA: MT 484

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 Sciences.
Faculty directed study including assigned readings, review of appropriate scientific periodicals, and research laboratory experience.
QA: MT 465

801. Medical Technology Seminar
Spring, 1-10 credits.
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. Current research topics in clinical laboratory sciences.
QA: MT 800

810. Research Planning in the Clinical Laboratory Sciences
Fall of odd-numbered years. 2(2-0)
Interdepartmental with Pathology.
Directed reading and discussions on research methodology and research funding. Written and oral presentation.
QA: MT 810

812. Advanced Clinical Chemistry
Spring of odd-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.

830. Concepts in Molecular Biology
Spring of even-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.
Pharmacology, pathophysiology, and laboratory evaluation of hemostatic disorders.
QA: MT 440 QA: MT 442

850. Clinical Laboratory Diagnosis of Infectious Diseases
Spring of odd-numbered years. 2(2-0)
Interdepartmental with Pathology.
Laboratory techniques for diagnosing infectious diseases in humans. Emphasis on differential diagnosis and correlation of microbiological results with serology, hemostasis, and clinical chemistry.
QA: MPH 501, MPH 502, MPH 496

890. Selected Problems in Clinical Laboratory Sciences
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.
Non-thesis research for Plan B master's students.

999. Master's Thesis Research
Fall, Spring, Summer. 1 to 10 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.

MEDICINE MED

Department of Medicine
College of Human Medicine

512. Infectious Diseases
Spring. 4 credits. Interdepartmental with Microbiology.
P: MPH 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.
QA: MED 512

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.
QA: MED 590

608. Internal Medicine Clerkship
Fall, Spring, Summer. 2 to 16 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.
P: FMP 602 QA: MED 608