

Medical Technology—MT

MEDICAL TECHNOLOGY

MT

Medical Technology Program College of Natural Science

- 120 Learning in the Biomedical Sciences**
Fall. 1 credit. Not open to students with credit in NSC 201 or NSC 202.
Learning strategies appropriate for science. Development of critical thinking and problem solving. Group processes. Adapting study to personal learning styles and college instruction.
- 150 Preview of Biomedical Research**
Spring. 1(1-0) Interdepartmental with Natural Science.
Exploration of biomedical research careers. Biomedical research in the United States: funding, safety, regulatory agencies, ethics, experimental design, trouble-shooting, and data interpretation.
- 204 Mechanisms of Disease**
Spring. 3(3-0) P:M: (BS 111)
Pathophysiological mechanisms of diseases. Selected applications to organ system pathology.
- 213 Application of Clinical Laboratory Principles**
Fall, Summer. 2(1-3) RB: (BS 111L) R: Open only to students in the Clinical Laboratory Sciences or Medical Technology or Human Biology major or LBS Medical Technology coordinate major.
Lab safety and standards of good laboratory practice including specimen handling and processing. Application of technologies and techniques to the performance of clinical diagnostic testing.
- 220 Preparing for a Health Professions Career**
Spring. 1(1-0) Not open to students with credit in MT 212.
Development of skills needed for success in health professions careers. Historical, economic, sociological and ethical perspectives on the U.S. health professions with focus on medical laboratory careers.
- 324 Fundamentals of Hematology, Hemostasis, and Urinalysis**
Fall. 3(3-0) P:M: (BS 111)
Physiology and biochemistry of normal hematologic, hemostatic and urinary systems. Principles of diagnostic assays to detect diseases affecting those systems.
- 324L Introductory Laboratory in Hematology, Hemostasis and Urinalysis**
Fall. 1(0-3) P:M: (MT 324) R: Open only to students in Clinical Laboratory Sciences. SA: MT 423
Routine laboratory assays used to assess the health of the hematological, hemostatic, and urinary systems.
- 414 Clinical Chemistry I: Laboratory Analysis and Practice**
Fall. 3(3-0) P:M: (STT 200 or STT 201 or STT 231 or STT 351 or STT 421) RB: (PHY 231 and PHY 232) and (MT 213)
Concepts and principles of analytic methods commonly used in the clinical laboratory. Qualitative and quantitative features of instrumental analysis. Issues of quality control and quality assurance, method evaluation and standards of laboratory practice.
- 415 Clinical Chemistry and Body Fluid Analysis Laboratory**
Spring. 1(0-3) P:M: (MT 213 and MT 414) R: Open only to students in the Clinical Laboratory Sciences major.
Quantitative analysis of blood and body fluids. Spectrophotometry, electrophoresis, chromatography, enzymatic assays, and immunoassays.
- 416 Clinical Chemistry II: Pathophysiology and Body Fluid Analysis**
Fall. 4(4-0) P:M: (MT 213) and (BMB 401 or BMB 461) and (PSL 250 or PSL 432) RB: (MT 414)
Correlation of laboratory test results with normal physiology and biochemistry and with disease states. Metabolic and endocrine systems. Acquired and inherited diseases. Therapeutic drug monitoring, and toxicology.
- 424 Advanced Hematology, Hemostasis and Urinalysis**
Spring. 2(2-0) P:M: (MT 324) SA: MT 422
Etiology and pathogenesis of diseases of the hematologic, hemostatic and urinary systems including anemias, leukemias, and hemophilias. Diagnostic testing for such diseases.
- 424L Advanced Laboratory in Hematology, Hemostasis, and Urinalysis**
Spring. 1(0-3) P:M: (MT 424 or concurrently) SA: MT 423
Specialized and advanced assays used in the diagnosis of diseases of the hematological, hemostatic, and urinary systems.
- 430 Molecular Laboratory Diagnostics**
Spring. 2(2-0) P:M: (BMB 401 and BS 111)
Concepts and principles of molecular analysis applied to medical diagnostics and related applications.
- 433 Clinical Immunology and Immunohematology Laboratory**
Spring. 1(0-3) P:M: (MT 213 and MT 435 or concurrently) R: Open only to students in the Clinical Laboratory Sciences major.
Immunologic methods for disease detection. Methods of blood typing and pre-transfusion testing.
- 434 Clinical Immunology**
Fall. 3(3-0) P:M: (BS 111) SA: MT 432 Not open to students with credit in MMG 451.
Concepts of innate, cellular, and humoral immunity; immunodeficiency and autoimmunity. Principles and applications of immunoassays in medical laboratories.
- 435 Transfusion and Transplantation Medicine**
Spring. 3(3-0) P:M: (MT 434 or MMG 451) SA: MT 432
Principles and practice of transfusion medicine including blood typing. Principles and practices of transplantation medicine. Transplantation immunology, organ procurement, and rejection detection.
- 442 Education and Management in the Clinical Laboratory**
Spring. 3(3-0) P:M: (MTH 116 or LBS 117) or (MTH 103 and MTH 114) or (STT 200 or STT 201 or STT 231 or STT 351 or STT 421) R: Open only to students in the Clinical Laboratory Sciences major.
Basic principles and concepts in education and management in clinical laboratories. Systematic approach to instructional design, delivery and evaluation. Principles of leadership, personnel management, fiscal management, and regulatory compliance.
- 450 Eukaryotic Pathogens**
Spring. 3(3-0) P:M: (BS 111) RB: (MMG 205 or MMG 301)
Medically important fungi and parasites. Host-parasite relationships, life cycles, culture, identification, and associated diseases.
- 455 Integrating Clinical Laboratory Science Discipline (W)**
Fall, Spring. 2(2-0) P:M: (MT 324 and MT 414 and MT 416 or concurrently and MMG 463 or concurrently and MT 435 or concurrently) and completion of Tier I writing requirement. R: Open only to seniors in the Medical Technology major or Clinical Laboratory Sciences undergraduate major.
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. P:M: (MT 415)
Application and integration of theory and technical skills in clinical chemistry and biochemistry.
- 472 Advanced Clinical Chemistry**
Fall, Spring, Summer. 1 credit. R: Open only to seniors in the Clinical Laboratory Sciences major. C: MT 471 concurrently.
Theoretical aspects of clinical chemistry, chemical and biochemical reactions, statistical analysis, and pathophysiologic relationships. Integration of cognitive material with clinical laboratory test results.
- 473 Advanced Clinical Hematology and Body Fluids Laboratory**
Fall, Spring, Summer. 4 credits. P:M: (MT 424L)
Application and integration of theory and technical skills in hematology, hemostasis, and body fluid analysis.
- 474 Advanced Clinical Hematology and Body Fluids**
Fall, Spring, Summer. 1 credit. R: Open only to seniors in the Clinical Laboratory Sciences major. C: MT 473 concurrently.
Theoretical aspects of advanced hematology, hemostasis and body fluid analysis. Integration of cognitive material with clinical laboratory test results.
- 475 Advanced Clinical Immunology and Immunohematology Laboratory**
Fall, Spring, Summer. 2 credits. P:M: (MT 433)
Application and integration of theory and technical skills in immunology and immunohematology.
- 476 Advanced Clinical Immunology and Immunohematology**
Fall, Spring, Summer. 1 credit. R: Open only to seniors in the Clinical Laboratory Sciences major. C: MT 475 concurrently.
Theoretical aspects of immunology and immunohematology. Integration of cognitive material with clinical laboratory test results.
- 477 Advanced Clinical Microbiology Laboratory**
Fall, Spring, Summer. 3 credits. P:M: (MMG 464 and MT 450)
Application and integration of theory and technical skills in clinical microbiology and infectious disease.

478 Advanced Clinical Microbiology
Fall, Spring, Summer. 1 credit. R: Open only to seniors in the Clinical Laboratory Sciences major. C: MT 477 concurrently. Theoretical aspects of clinical microbiology and infectious disease. Integration of cognitive material with clinical laboratory test 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 students in the Clinical Laboratory Sciences or Medical Technology major or LBS Medical Technology coordinate major. Faculty directed study including assigned readings, reviews of appropriate scientific periodicals, research and laboratory experience.

496 Integrative Correlations in Clinical Laboratory Science I
Fall, Spring. 1(2-0) P:M: (MT 213) R: Open only to juniors or seniors in the Medical Technology or Clinical Laboratory Science and Lyman Briggs coordinate majors. Application of the principles and concepts of clinical laboratory science in a problem-based learning format. Ethics, diagnostic value of laboratory tests, social-economic impact of laboratory tests and their regulation.

497 Integrative Correlations in Clinical Laboratory Science II
Fall, Spring. 1(2-0) P:M: (MT 496) R: Open only to juniors or seniors in the Medical Technology or Clinical Laboratory Science and Lyman Briggs coordinate majors. Continuation of MT 496.

MICROBIOLOGY AND MOLECULAR GENETICS MMG

Department of Microbiology and Molecular Genetics College of Natural Science

101 Preview of Microbiology
Fall. 1(1-0) R: Open only to freshmen or sophomores. SA: MPH 101
Overview of modern microbiology, emphasizing impact on society.

103 Frontiers of Microbiology
Spring. 1(2-0) R: Open only to freshmen and sophomores. Current microbiology research: significance to modern biological science and impact on society.

105 Microbes in Everyday Life
Fall. 3(3-0)
Role of microbes in agriculture, industry, and medicine. Impact on society of infectious diseases of plants and animals, soil fertility, water quality, biotechnology, genetic engineering, and bioremediation. Public health and environmental concerns.

111L Cell and Molecular Biology Laboratory
Fall, Spring, Summer. 2(1-3) Interdepartmental with Biological Science; Plant Biology; Zoology. Administered by College of Natural Science. P:M: (BS111 or concurrently) Not open to students with credit in LBS 159H. Principles and applications of common techniques used in cell and molecular biology.

205 Allied Health Microbiology
Spring. 3(3-0) SA: MPH 205
Microbial structure, function, growth, death, and control related to medical and public health concerns. Host-parasite relationships, immunology, action of major pathogenic groups. Commercial applications of microbiology.

206 Allied Health Microbiology Laboratory
Spring. 1(0-2) P:M: (MMG 105 or MMG 205 or concurrently) SA: MPH 206
Fundamentals of microbiological techniques including microscopy, staining, aseptic technique, culture media, identification, control with disinfectants and antibiotics, and safety in the microbiological laboratory.

301 Introductory Microbiology
Fall, Spring. 3(3-0) P:M: (BS 111 or LBS 145 or LBS 149H) and (CEM 251 or concurrently or CEM 351 or concurrently or CEM 143) SA: MPH 301
Fundamentals of microbiology, including microbial structure and function, nutrition and growth, death and control. Importance and applications of major microbial groups.

302 Introductory Microbiology Laboratory
Spring. 1(0-3) P:M: (MMG 105 or concurrently or MMG 205 or concurrently or MMG 301 or concurrently) SA: MPH 302
Methodology of microbiology: microscopy, staining, aseptic technique, culture media, quantification, and laboratory safety.

408 Advanced Microbiology Laboratory (W)
Fall. 3(1-6) P:M: (MMG 302 and MMG 431 or concurrently) and completion of Tier I writing requirement. R: Open only to students in the Department of Microbiology and Molecular Genetics or LBS Environmental Biology/Microbiology or Microbiology coordinate major. SA: MPH 408
Microbiological techniques and procedures to study physiology and genetics of bacteria and bacteriophages. Collection and critical assessment of quantitative data and written communication of results.

409 Eukaryotic Cell Biology
Spring. 3(3-0) P:M: (BS 111 or LBS 145 or LBS 149H) and (BMB 401 or concurrently or BMB 462 or concurrently) SA: MIC 403, MPH 403
Structure and function of nucleated cells. Emphasis on the molecular mechanisms that underlie cell processes.

413 Virology
Spring. 3(3-0) P:M: (BMB 462 or concurrently) RB: (MMG 409) SA: MPH 403
Viruses and modern molecular biology. Viral replication and gene expression of the major classes of viruses. Virus-cell interactions and viral diseases.

421 Prokaryotic Cell Physiology
Fall. 3(3-0) P:M: (MMG 301 and BMB 461 or concurrently) SA: MIC 401, MPH 401
Prokaryotic cell structure and function. Growth and replication. Macromolecular synthesis and control.

425 Microbial Ecology
Spring. 3(3-0) Interdepartmental with Crop and Soil Sciences. RB: (MMG 301) SA: MPH 425
Microbial population and community interactions. Microbial activities in natural systems, including associations with plants or animals.

426 Biogeochemistry
Summer. 3 credits. Summer: Given only at W.K. Kellogg Biological Station. Interdepartmental with Crop and Soil Sciences; Geological Sciences; Zoology. RB: (BS 110 or LBS 144 or LBS 148H or BS 111 or LBS 145 or LBS 149H) and (CEM 143 or CEM 251) SA: MPH 426
Integration of the principles of ecology, microbiology, geochemistry, and environmental chemistry. Societal applications of research in aquatic and terrestrial habitats.

431 Microbial Genetics
Fall. 3(3-0) P:M: (BMB 461 or concurrently) RB: (MMG 301 or ZOL 341) SA: MIC 401, MPH 401
Genetics of bacteria, their viruses, plasmids, and transposons. Emphasis on genetic principles.

433 Microbial Genomics
Spring. 3(2-3) P:M: (MMG 431) RB: (MMG 421 or BMB 461) and (CSE 101)
Structure of microbial genomes and implications for growth and evolution of bacteria and fungi. Computer analysis of genome sequence databases. Applications to gene expression and phylogenetic analysis.

440 Food Microbiology
Spring. 3(3-0) Interdepartmental with Food Science. Administered by Department of Food Science and Human Nutrition. P:M: (MMG 205 or MMG 301) and completion of Tier I writing requirement. R: Not open to freshmen or sophomores. SA: MPH 440
Major groups of microorganisms of importance to the food industry. Emphasis on ecological, physiological, and public health aspects.

441 Food Microbiology Laboratory
Spring. 2(0-4) Interdepartmental with Food Science. Administered by Department of Food Science and Human Nutrition. P:M: (FSC 440 or concurrently) and completion of Tier I writing requirement. RB: (MMG 206 or MMG 302) SA: MPH 441
Methods for studying major groups of microorganisms important to the food industry. Isolation, enumeration, characterization, identification, and use of microorganisms.

445 Basic Biotechnology
Fall. 3(3-0) P:M: (MMG 205 or MMG 301) SA: MPH 445
Growth and genetic improvement of industrial microorganisms. Fermentation fundamentals. Specific classical and recombinant-based bioprocesses and bioconversions of commercial importance.

451 Immunology
Fall. 3(3-0) P:M: (BS 111 or LBS 145 or LBS 149H) and (BMB 401 or concurrently or BMB 461 or concurrently) RB: (MMG 409) SA: MPH 451
Structure and function of molecules involved in immune responses. Quantification of immune responses and cellular participants. Immunologic abnormalities. Immunotherapy. Experimental approaches to dissection of immune functions.

461 Molecular Pathogenesis
Spring. 3(3-0) P:M: (MMG 301) RB: (MMG 431) SA: MPH 461
Molecular basis of microbial virulence. Nature of determinants and their role in overcoming host defense mechanisms.