MEDICAL TECHNOLOGY MT

Biomedical Laboratory Diagnostics 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. Administered by Medical Technology.
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 or LBS 145
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) R: Open only to freshmen or sophomores or juniors. SA: 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 or concurrently) or (LBS 145 or concurrently)
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.

416 Clinical Chemistry
Fall. 4(4-0) P:M: MT 213 and (BMB 401 or BMB 461) and (PSL 250 or PSL 432) RB: MT 417 and (CEM 332 or CEM 333)
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.

417 Quality Processes in Diagnostic Laboratory Testing
Fall. 2(2-0) P:M: (STT 200 or concurrently) or (STT 201 or concurrently) or (STT 421 or concurrently) or (STT 351 or concurrently) or (STT 231 or concurrently) RB: MT 213 SA: MT 414
Statistical methods for validating diagnostic laboratory tests including quality control processes, proficiency testing, method evaluation, related regulatory requirements, laboratory information systems, and laboratory mathematics.

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) or (BMB 461 and BMB 462) and (BS 111 or LBS 145)
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 or concurrently) or LBS 145 or LBS 149H or LBS 159H 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.

436 Principles of Diagnostic Molecular Science
Spring. 2(2-0) P:M: BMB 461 and BS 111 and ZOL 341 Not open to students with credit in MT 830. C: BMB 462 concurrently.
Principles and techniques of molecular diagnostic assays including applicable regulations.

437 Clinical Applications of Diagnostic Molecular Science
Spring. 2(2-0) P:M: MT 436 Not open to students with credit in MT 831.
Application of molecular diagnostic methods in clinical and other types of laboratory disciplines.

438 Molecular Diagnostic Laboratory
Fall. 2(0-6) P:M: MT 436 Not open to students with credit in MT 832.
Laboratory in molecular techniques with emphasis on clinical and diagnostic applications.

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 or concurrently) and (MT 417 or concurrently) and (MT 416 or concurrently) and (MMG 463 or concurrently) and (MT 435 or concurrently) and (CEM 332 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: CEM 333
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. 3 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.

479 Professional Behavior in Clinical Laboratory Science
Fall, Spring, Summer. 1(0-2) P:M: (MT 220 and MT 442) and ((MT 471 or concurrently) or (MT 473 or concurrently) or (MT 475 or concurrently) or MT 477)
Application of professional behavior principles to practical experiences in clinical laboratory science.

482 Advanced Diagnostic Molecular Science
Spring. 2 credits. R: Open only to students in the Diagnostic Molecular Science major. C: MT 483 concurrently or MT 484 concurrently or MT 485 concurrently or MT 486 concurrently.
Integration of principles and concepts in diagnostic molecular science with diagnostic laboratory test results.

483 Molecular Diagnostic Experience in Hematopathology and Oncology
Spring. 2 credits. P:M: MT 438 or concurrently R: Open only to students in the Diagnostic Molecular Science major. C: MT 482 concurrently.
Clinical experience in molecular diagnostic laboratories with applications in hematopathology and oncology

484 Molecular Diagnostic Experience in Infectious Disease
Spring. 2 credits. P:M: MT 438 or concurrently R: Open only to students in the Diagnostic Molecular Science major. C: MT 437 concurrently.
Clinical experience in molecular diagnostic laboratories with applications to infectious disease diagnosis.

485 Molecular Diagnostic Experience in Inherited and Predictive Genetics
Spring. 2 credits. P:M: MT 438 or concurrently R: Open only to students in the Diagnostic Molecular Science major. C: MT 482 concurrently.
Clinical experience in molecular diagnostic laboratories with applications in inherited and predictive genetics.

486 Molecular Diagnostic Experience in Genotyping and Individual Identification
Spring. 2 credits. P:M: (MT 437 or concurrently) and MT 438 R: Open only to students in the Diagnostic Molecular Science major. C: MT 482 concurrently.
Clinical experience in molecular diagnostic laboratories with applications to genotyping and identification of individuals.

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 major or Clinical Laboratory Science major or Lyman Briggs Medical Technology coordinate major or Lyman Briggs Clinical Laboratory Sciences coordinate major.
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 major or Clinical Laboratory Science major or Lyman Briggs Medical Technology coordinate major or Lyman Briggs Clinical Laboratory Science coordinator major.
Continuation of MT 496.

498 Integrative Correlations in Clinical Laboratory Science III
Spring. 2(1-2) P:M: (MMG 463 or concurrently) and (MMG 464 or concurrently) and MT 496 R: Open only to students in the Clinical Laboratory Sciences major. SA: MT 454
Continuation of MT 496 with emphasis on cases of medical microbiology, hematology, and clinical chemistry.

498 Integrative Correlations in Clinical Laboratory Science III
Spring. 2(1-2) P:M: (MMG 463 or concurrently) and (MMG 464 or concurrently) and MT 496 R: Open only to students in the Clinical Laboratory Sciences major. SA: MT 454
Continuation of MT 496 with emphasis on cases of medical microbiology, hematology, and clinical chemistry.

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 the Clinical Laboratory Sciences major.
Current research topics in clinical laboratory sciences.

820 Advanced Human Hematology
Spring of odd years. 2(2-0) Interdepartmental with Pathobiology and Diagnostic Investigation. Administered by Medical Technology. RB: MT 424
Pathogenesis, mechanisms, and morphological pictures. Laboratory tests and interpretation of results.

830 Concepts in Molecular Biology
Fall, Spring. 2(2-0) Interdepartmental with Pathobiology and Diagnostic Investigation. Administered by Medical Technology. RB: 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.

831 Clinical Application of Molecular Biology
Spring, Summer. 2(2-0) P:M: MT 830 RB: Basic biochemistry, medical or research laboratory experience
Molecular diagnostic principles. Diagnostic outcomes in traditional and non-traditional laboratory disciplines.

832 Molecular Pathology Laboratory
Summer. 2(0-4) P:M: MT 831 or concurrently SA: MT 831L
Equipment operation, DNA extraction and measurement, electrophoresis, hybridization and transfers, amplification and detection including techniques and automated sequencing. Clinical applications.

842 Managing Biomedical Laboratory Operations
Fall. 2(2-0) R: Open only to students in the Biomedical Laboratory Operations major or approval of department.
Integration of the roles of legislative, regulatory, technological and economic factors that influence the practice and management of biomedical laboratory operations.

844 Topics in Biomedical Laboratory Operations
Spring. 1(1-0) P:M: MT 842 R: Open only to students in the Biomedical Laboratory Operations major or approval of department.
Current issues relevant to biomedical laboratory operations from an interdisciplinary perspective with an emphasis on efficient laboratory operations.

846 Decision Processes for Biomedical Laboratory Operations
Fall. 2(2-0) P:M: MT 842 R: Open only to students in the Biomedical Laboratory Operations major or approval of department.
Integrative case studies presented in a problem-based learning format. Strategies for decision making in the operations of a biomedical laboratory. Cases integrate scientific principles, management principles and regulatory factors.

850 Concepts in Immunodiagnostics
Fall, Spring. 2(2-0) RB: An undergraduate course in biochemistry or cell biology.
Immunology principles and theory applied to diagnostic evaluation of the host immune response during health and disease.

851 Clinical Application of Immunodiagnostic Principles
Spring, Summer. 2(2-0) P:M: MT 850
Immunodiagnostic theories and principles applied to clinical assay development and method evaluation.

852 Immunodiagnostics Laboratory
Summer. 2(2-0) SA: MT 851L
Performance of immunopurifications, in vitro diagnostic assays and basic flow cytometry. Data analysis and quality control evaluation.

860 Clinical Laboratory Diagnosis of Infectious Diseases
Fall of odd years. 2(2-0) Interdepartmental with Pathobiology and Diagnostic Investigation. Administered by Medical Technology. RB: MMG 451 and MMG 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 the Clinical Laboratory Sciences major.
Non-thesis research for Plan B master's students.

895 Projects in Biomedical Laboratory Operations
Fall, Spring, Summer. 1 to 6 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Open only to students in the Biomedical Laboratory Operations major or approval of department.
Students complete a significant on-site project in cooperation with an industrial/clinical partner.

899 Master's Thesis Research
Fall, Spring, Summer. 1 to 10 credits. A student may earn a maximum of 36 credits in all enrollments for this course. R: Open only to graduate students in the Clinical Laboratory Sciences major.
Master's thesis research.