BIOMEDICAL LABORATORY DIAGNOSTICS BLD

Biomedical Laboratory Diagnostics Program
College of Natural Science

121 Survive and Thrive Freshman Seminar
Fall, Spring. 1(1-0) R: Open to freshmen or sophomores in the Biomedical Laboratory Science Major or in the Lyman Briggs Biomedical Laboratory Science Coordinate Major or approval of department.
Academic skills and communication skills with an emphasis on scientific communication, professional behavior. History of the medical and the medical laboratory professions, and campus resources for a successful college experience.

204 Mechanisms of Disease
Fall, Spring, Summer. 3(3-0) P: PSL 310 or PSL 431 R: Not open to seniors. SA: MT 204
Pathophysiological mechanisms of diseases. Selected applications to organ system pathology.

213L Clinical Laboratory Methods
Fall, Spring, Summer. 2(2-2) P: (CEM 141 and CEM 161) or (LB 171 and LB 171L) RB: BS 171 R: Open to students in the Human Biology Major or in the Biomedical Laboratory Science Major or in the Lyman Briggs Biomedical Laboratory Science Coordinate Major. SA: MT 213, BLD 213
Lab safety and standards of good laboratory practice, including specimen handling and processing. Application of techniques and technologies to the performance of clinical diagnostic testing.

214L Biomedical Laboratory Research Techniques
Summer. 2(1-3) P: MTH 103 or MTH 116 or MTH 124 or approval of department
Basic techniques, skills and safety in biomedical research. Ethical conduct of research and regulatory principles such as Good Laboratory Practice. Maintaining a research notebook for legal and intellectual property purposes. Offered second half of semester.

302 Clinical Chemistry
Spring. 2(2-0) P: BLD 204 and BLD 313
Correlation of common medical laboratory testing and associated diseases, including comprehensive metabolic panel, lipid panel, thyroid panel, urinalysis and drugs of abuse screening.

313 Quality in Clinical Laboratory Practice
Fall, Spring. 3(3-0) P: (BLD 213L) and (STT 201 or STT 200 or STT 231) and completion of Tier I writing requirement) RB: PHY 232 SA: BLD 414, BLD 417
Concepts and principles of clinical laboratory analysis and the statistical evaluation of the data produced as related to quality.

314L Advanced Clinical Laboratory Methods
Fall, Spring. 1(0-3) P: BLD 213L RB: BLD 204 and BLD 324 R: Open to students in the Biomedical Laboratory Science Major or in the Lyman Briggs Biomedical Laboratory Science Coordinate Major.
Diagnoses assays across various disciplines within the clinical laboratory including hematology, immunohematology, coagulation, urinalysis, and molecular diagnostics. Data interpretations and problem solving skills.

324 Hematology and Hemositosis
Fall. 3(3-0) P: BLD 204 or concurrently SA: MT 324
Physiology and biochemistry of normal hematologic and hemostatic systems. Principles of diagnostic assays to detect diseases affecting those systems.

365 Medical Microbiology Laboratory
Spring. 3(0) Interdepartmental with Microbiology and Molecular Genetics. Administered by Microbiology and Molecular Genetics. P: (BS 161 and CEM 141) and (MMG 201 or MMG 301) Not open to students with credit in MMG 463.
Laboratory diagnosis, disease and epidemiology of the most common bacterial, viral, fungal and parasitic pathogens and concepts in infectious disease control, prevention and treatment.

365L Medical Microbiology Laboratory
Spring. 1(0-2) Interdepartmental with Microbiology and Molecular Genetics. Administered by Microbiology and Molecular Genetics. P: (MMG 365 or concurrently) and (MMG 201 or MMG 301) Not open to students with credit in MMG 464.
Practical experience in safely and accurately performing standard clinical microbiology tests to diagnose disease-causing microbes.

366 Infectious Diseases of East Africa
Summer. 4(1-6) Summer. Africa. P: (BLD 213) or BLD 214L or (CEM 162 and BS 171) or (LB 145 and LB 172L) RB: Pre-health professional undergraduate students with junior or senior status. R: Approval of department.
Biology and laboratory diagnosis of the most common infectious disease of the region. Health disparities and healthcare system organization.

402 Advanced Clinical Chemistry
Spring. 4(4-0) P: (BLD 302 and BMB 461 and BMB 462)
Differences in clinical laboratory testing results between normal and diseased populations. Metabolic and endocrine systems, acquired and inherited diseases, therapeutic drug monitoring and toxicology.

424 Advanced Hematology and Hemostasis
Spring. 2(2-0) P: (BLD 324 and BMB 401) or (BLD 324 and BMB 461 and BMB 462) RB: (BLD 430 and BLD 434 and (BLD 435 or concurrently) and (PSL 250 or PSL 310) R: Open to undergraduate students in the Biomedical Laboratory Diagnostics Program. SA: MT 422, MT 424
Etiology and pathogenesis of diseases of the hematologic and hemostatic systems including anemias, leukemias, and hemophilies. Diagnostic testing for such diseases.

424L Advanced Hematology, Hemostasis and Urinalysis Laboratory
Spring. 1(0-3) P: (BLD 314L and BLD 324) and (BLD 424 or concurrently) R: Open to undergraduate students in the Biomedical Laboratory Diagnostics Program. SA: MT 424L, MT 423
Specialized and advanced assays used in the diagnosis of diseases of the hematological, hemostatic, and urinary systems.

430 Molecular Diagnostics
Spring. 2(2-0) P: (BS 161 or LB 145 or BS 181H) and (BLD 204 and BLD 313) SA: MT 430
Concepts and principles of molecular analysis applied to medical diagnostics and related applications.

430L Molecular Diagnostics Laboratory
Fall. 1(0-3) P: BLD 430 R: Open to undergraduate students in the Biomedical Laboratory Diagnostics Program or approval of department.
Molecular technologies with emphasis on clinical and diagnostic applications.

434 Clinical Immunology
Fall, Spring, Summer. 3(3-0) P: BLD 204 RB: MMG 201 or MMG 301 SA: MT 432, MT 434
Not open to students with credit in MMG 451.
Concepts of innate and adaptive immunity. Immunodeficiency and autoimmunity. Principles and applications of immunoassays in medical laboratories.

435 Immunohematology
Spring. 2(3-0) P: (BLD 313) and (BLD 434 or MMG 451) SA: MT 435, MT 432
Principles and practice of transfusion medicine including blood typing. Offered first ten weeks of semester.

435L Immunohematology Laboratory
Spring. 1(0-3) P: BLD 314L and BLD 435 R: Open to undergraduate students in the Biomedical Laboratory Diagnostics Program. SA: MT 433, BLD 433
Methods of blood typing and pre-transfusion testing.

439 Histocompatibility and Immunogenetics
Spring. 1(0-1) P: BLD 434 or MMG 451 RB: BLD 204 and BLD 435 R: Open to juniors or seniors in the College of Natural Science or in the Lyman Briggs College.
The theory and principles of histocompatibility and immunogenetics as applied to transplant medicine.

443 Introduction to Laboratory Information Systems
Spring. 3(3-0) P: (CSE 201 or CSE 231) and (MTH 124 or MTH 132) and BLD 213L R: Open to students in the Information Technology Minor.
Purpose and function of information systems components used in medical laboratories. Practical applications of system selection, validation, maintenance, problem resolution and report generation.
444 Laboratory Information Technology Practicum and Project Management
Summer. 3(0-40) P: BLD 443 and ITM 311
RB: Biomedical Laboratory Science major. R: Open to students in the Information Technology Minor. Approval of department.
Gain experience in using, maintaining and managing quality of a laboratory information system at a clinical or public health laboratory site. Project management principles and application.

445 Medical Laboratory Management
Fall. 1(1-0) P: BLD 456 or concurrently R: Open to students in the Biomedical Laboratory Diagnostics Program. Approval of department.
Management of clinical laboratories through adherence to laws and regulations, developing financial and budgeting tools, and assuring a competent workforce.

446 Immunobiology of Neoplasia
Spring. 1(1-0) P: BLD 434 or MMG 451 RB: BLD 204 and BLD 435 R: Open to juniors or seniors in the College of Natural Science or in the Lyman Briggs College.
The biology of neoplastic cells (cancers, leukemias, lymphomas), the immune response to neoplasias, and immunotherapy of cancer.

447 Immunomodulation and Immunotherapy
Spring. 1(1-0) P: BLD 434 or MMG 451 RB: BLD 204 and BLD 435 R: Open to juniors or seniors in the College of Natural Science or in the Lyman Briggs College.
Current applications of Immunology understanding in the immunomodulation and immunotherapy of infectious disease, immunodeficiencies, autoimmune disease, and cancers.

452L Immunodiagnostics Laboratory
Spring. 1(0-3) P: BLD 314L and BLD 434 R: Open to students in the Biomedical Laboratory Science Major or approval of department.
Not open to students with credit in BLD 852.
Performance of immunopurifications, in vitro diagnostic assays and basic flow cytometry. Data analysis and quality control evaluation.

456 Medical Laboratory Professionalism (W)
Fall, Spring. 2(2-0) P: (BLD 121 and BLD 313) and completion of Tier I writing requirement RB: (BLD 302 and BLD 324 and BLD 435) and (MMG 201 or MMG 301) R: Open to seniors in the Biomedical Laboratory Diagnostics Program.

460 Advanced Molecular Diagnostics
Fall. 2(2-0) P: BLD 430 R: Open to students in the Lyman Briggs College or in the College of Natural Science.
Common and specialized molecular diagnostic technologies applied to medical diagnostics and related applications.

465 Advanced Medical Microbiology
Fall. 3(3-0) Interdepartmental with Microbiology and Molecular Genetics. Administered by Microbiology and Molecular Genetics. P: MMG 365 Not open to students with credit in MMG 463.
Advanced laboratory diagnosis, epidemiology, and prevention of infectious diseases using an anatomical system approach to study a comprehensive set of human pathogens and microbiota.

465L Advanced Medical Microbiology Laboratory
Fall. 2(0-6) Interdepartmental with Microbiology and Molecular Genetics. Administered by Microbiology and Molecular Genetics. P: MMG 365L and (MMG 465 or concurrently) Not open to students with credit in MMG 464. C: MMG 465 concurrently.
Practical experience in safely and accurately performing standard clinical microbiology tests to process clinical specimens, identify pathogens and perform and interpret susceptibility testing.

471L Advanced Clinical Chemistry Laboratory
Fall, Spring, Summer. 3 credits. P: CEM 333 R: Open to students in the Biomedical Laboratory Diagnostics Program. Approval of department. SA: MT 471, BLD 471 Application and integration of theory and technical skills in clinical chemistry and biochemistry.

472 Advanced Clinical Chemistry
Fall, Spring, Summer. 1 credit. P: BLD 416 and BLD 417 R: Open to seniors in the Clinical Laboratory Sciences major. SA: MT 472 Theoretical aspects of clinical chemistry, chemical and biochemical reactions, statistical analysis, and pathophysiological relationships. Integration of cognitive material with clinical laboratory test results.

473L Advanced Clinical Hematology and Body Fluids Laboratory
Fall, Spring, Summer. 3 credits. P: BLD 424L R: Open to seniors in the Clinical Laboratory Diagnostics Program. Approval of department. SA: MT 473, BLD 473 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. P: BLD 424 R: Open to seniors in the Clinical Laboratory Sciences major. SA: MT 474 Theoretical aspects of advanced hematology, hemostasis and body fluid analysis. Integration of cognitive material with clinical laboratory test results.

475L Advanced Clinical Immunology and Immunohematology Laboratory
Fall, Spring, Summer. 2 credits. P: BLD 435L R: Open to students in the Biomedical Laboratory Diagnostics Program. Approval of department. SA: MT 475, BLD 475 Application and integration of theory and technical skills in immunology and immunohematology.

476 Advanced Clinical Immunology and Immunohematology
Fall, Spring, Summer. 1 credit. P: BLD 433 and BLD 434 and BLD 435 R: Open to seniors in the Clinical Laboratory Sciences major. SA: MT 476 Theoretical aspects of immunology and immunohematology. Integration of cognitive material with clinical laboratory test results.

477L Advanced Clinical Microbiology Laboratory
Fall, Spring, Summer. 3 credits. P: MMG 465L R: Open to students in the Biomedical Laboratory Diagnostics Program. Approval of department. SA: MT 477, BLD 477 Application and integration of theory and technical skills in clinical microbiology and infectious disease.

478 Advanced Clinical Microbiology
Fall, Spring. 1 credit. P: MMG 463 and BLD 450 and BLD 498 R: Open to seniors in the Clinical Laboratory Sciences major. SA: MT 478 Theoretical aspects of clinical microbiology and infectious disease. Integration of cognitive material with clinical laboratory test results.

479 Professional Behavior in Medical Laboratory Science
Fall, Spring. 1(0-2) P: (BLD 445 and BLD 456) and (BLD 471L or concurrently) and (BLD 473L or concurrently) and (BLD 475L or concurrently) R: Open to students in the Biomedical Laboratory Diagnostics Program. Approval of department. SA: MT 479 Application of professional behavior principles to practical experiences in medical laboratory science.

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 to students in the Biomedical Laboratory Science Major or in the Lyman Briggs Biomedical Laboratory Science Coordinate Major. SA: MT 495 Faculty directed study including assigned readings, reviews of appropriate scientific periodicals, research, and laboratory experience.

801 Biomedical Laboratory Diagnostics Seminar
Fall, Spring, Summer. 1(1-0) A student may earn a maximum of 2 credits in all enrollments for this course. SA: MT 801 Current research topics in clinical laboratory sciences.

805 Communication in the Sciences
Fall. 2(2-0) Professional communication in clinical laboratory science, including article and proposal writing, thesis writing, posters, and presentations.

811 Fundamentals of Scientific Research
Fall. 1(1-0) R: Open to master's students in the Biomedical Laboratory Diagnostics Program. SA: MT 810 Best practices for the research enterprise. Ethical conduct of research. Critical evaluation of scientific literature.
Clinical Context of Blood Product Transfusion Service.

Transfusion Service Operations and Adverse Transfusion Outcomes: Hemostasis, Thrombosis and Effective Molecular Pathology Laboratory

Clinical Application of Molecular Biology

Molecular Pathology Laboratory

Clinical Application of Molecular Biology

Molecular Pathology Laboratory

Clinical Application of Immunodiagnostic Principles

Immunodiagnostics Laboratory

Advanced Flow Cytometry

Advanced Flow Cytometry Laboratory

Master's Thesis Research

Clinical Mass Spectrometry Theory

Clinical Mass Spectrometry Laboratory

Selected Problems in Clinical Laboratory Science

Projects in Biomedical Laboratory Operations