Biomedical Laboratory Diagnostics Program

College of Natural Science

120 Learning in the Biomedical Sciences
Fall. 1 credit. R: Open to freshmen or sophomores. SA: MT 120 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 Biomedical Laboratory Diagnostics. R: Open to freshmen or sophomores. SA: MT 150 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: BS 161 or LB 145 or BS 181H SA: MT 204 Pathophysiologic mechanisms of diseases. Selected applications to organ system pathology.

213 Application of Clinical Laboratory Principles
Fall, Summer. 2(1-3) 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 Clinical Laboratory Sciences major or in the Diagnostic Molecular Science Coordinate Major or in the Lyman Briggs Medical Technology Coordinate Major or in the Lyman Briggs Diagnostic Molecular Science Coordinator Major or in the Lyman Briggs Medical Technology Coordinator Major. SA: MT 213 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 to sophomores or juniors. SA: MT 220 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: (BS 161 or concurrently) or (LB 145 or concurrently) or (BS 161H or concurrently) SA: MT 324 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: BLD 324 or concurrently R: Open to students in the Clinical Laboratory Sciences major. SA: MT 423, MT 324L Routine laboratory assays used to assess the health of the hematological, hemostatic, and urinary systems.

413 Advanced Biomedical Laboratory Diagnostics Laboratory
Spring. 1(0-3) P: BLD 213 and BLD 324 and BLD 434 and BLD 435 and MMG 463 RB: BLD 424 and BLD 430 R: Open to students in the Diagnostic Molecular Science major or in the Medical Technology major or in the Lyman Briggs Diagnostic Molecular Science Coordinator Major or in the Lyman Briggs Medical Technology Coordinator Major. SA: MT 417 Not open to students with credit in BLD 417.

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

433 Clinical Immunology and Immunohematology Laboratory
Spring. 1(0-3) P: BLD 213 and (BLD 435 or concurrently) R: Open to students in the Clinical Laboratory Sciences major. SA: MT 433 Immunologic methods for disease detection. Methods of blood typing and pre-transfusion testing.

434 Clinical Immunology
Fall, Spring, Summer. 3(3-0) R: Open to students with credit in BLD 434. SA: MT 434 Concepts of innate, cellular, and humoral immunity. Immunodeficiency and autoimmunity. Principles and applications of immunosassays in medical laboratories.

435 Transfusion and Transplantation Medicine
Spring. 3(3-0) P: BLD 434 or MMG 451 SA: MT 435 Principles and practice of transfusion medicine. Principles and practices of transplantation medicine. Transplantation immunology, organ procurement, and rejection detection.

436 Principles of Diagnostic Molecular Science
Spring. 2(2-0) P: (BBM 461 and (BS 161 or LB 145 or BS 181H) and ZOL 341 SA: MT 436 Not open to students with credit in BLD 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: BLD 436 SA: MT 437 Not open to students with credit in BLD 831. Application of molecular diagnostic methods in clinical and other types of laboratory disciplines.

438 Molecular Diagnostic Laboratory
Fall. 2(0-6) P: BLD 436 SA: MT 438 Not open to students with credit in BLD 832. Laboratory in molecular techniques with emphasis on clinical and diagnostic applications.
442 Education and Management in the Clinical Laboratory
Fall, Spring. 3-3-0: P: MTH 116 or (MTH 103 and MTH 114) or (STT 200 or STT 201 or STT 231 or STT 351 or STT 421) R: Open to students in the Clinical Laboratory Sciences major or in the Diagnostic Molecular Science major. SA: MT 442
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: BS 161 or LB 145 or BS 161H, RB: MMG 201 or MMG 301 SA: MT 450
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: ((BLD 324 or concurrently) or (BLD 417 or concurrently) or (BLD 416 or concurrently) or (MMG 463 or concurrently) or (BLD 435 or concurrently) or (CEM 332 or concurrently) or (BLD 436 or concurrently)) and completion of Tier I writing requirement R: Open to undergraduate students in the Clinical Laboratory Sciences major and open to undergraduate students in the Diagnostic Molecular Science major and open to undergraduate students in the Medical Technology major. SA: MT 455
Problem oriented approach integrating topics from biomedical laboratory diagnostics courses with emphasis on writing expression in the major and on critical thinking skills.

463 Medical Microbiology
Fall. 3-3-0 Interdepartmental with Microbiology and Molecular Genetics. Administered by Microbiology and Molecular Genetics. P: MMG 301 RB: MMG 451 or BLD 434 R: Open to juniors or seniors in the Biomedical Laboratory Diagnostics Program or in the Department of Microbiology and Molecular Genetics or in the Lyman Briggs Environmental/Biology/Microbiology Coordinate Major or in the Lyman Briggs Genomics and Molecular Genetics Coordinate Major or in the Lyman Briggs Human Biology Coordinate Major or in the Human Biology major or in the Lyman Briggs Medical Technology Coordinate Major or in the Lyman Briggs Microbiology Coordinate Major or in the Environmental Biology/Microbiology major or in the Genomics and Molecular Genetics major. SA: MCB 463
Properties of pathogenic bacteria and viruses and their mechanisms of pathogenicity and clinical diagnoses.

464 Diagnostic Microbiology Laboratory
Fall. 2-0-4 Interdepartmental with Microbiology and Molecular Genetics. Administered by Microbiology and Molecular Genetics. P: MMG 463 or concurrently R: Open to juniors or seniors in the Department of Microbiology and Molecular Genetics or in the Biomedical Laboratory Diagnostics Program or in the Clinical Laboratory Sciences major. SA: MCB 464
Clinical laboratory diagnostic procedures for the identification of pathogenic microbes.

471 Advanced Clinical Chemistry Laboratory
Fall, Spring, Summer. 3 credits. P: CEM 333 R: Open to students in the Clinical Laboratory Sciences major. SA: MT 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.

473 Advanced Clinical Hematology and Body Fluids Laboratory
Fall, Spring, Summer. 3 credits. P: BLD 424L R: Open to seniors in the Clinical Laboratory Sciences major. SA: MT 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 C: BLD 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: BLD 433 R: Open to seniors in the Clinical Laboratory Sciences major. SA: MT 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 435 and BLD 434 R: Open to seniors in the Clinical Laboratory Sciences major. SA: MT 476 C: BLD 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: MMG 464 and BLD 450 R: Open to seniors in the Clinical Laboratory Sciences major. SA: MT 477
Application and integration of theory and technical skills in clinical microbiology and infectious disease.

478 Advanced Clinical Microbiology
Fall, Spring, Summer. 1 credit. P: MMG 463 or BLD 450 or BLD 498 R: Open to seniors in the Clinical Laboratory Sciences major. SA: MT 478 C: BLD 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: (BLD 220 and BLD 442) and (BLD 471 or concurrently) or (BLD 473 or concurrently) or (BLD 475 or concurrently) or (BLD 477 or concurrently) R: Open to students in the Clinical Laboratory Sciences major. SA: MT 479
Application of professional behavior principles to practical experiences in clinical laboratory science.

482 Advanced Diagnostic Molecular Science
Spring. 2 credits. R: Open to students in the Diagnostic Molecular Science major. SA: MT 482 C: BLD 483 concurrently or BLD 484 concurrently or BLD 485 concurrently or BLD 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: BLD 438 R: Open to students in the Diagnostic Molecular Science major. SA: MT 483 C: BLD 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: BLD 438 R: Open to students in the Diagnostic Molecular Science major. SA: MT 484 C: BLD 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: BLD 438 R: Open to students in the Diagnostic Molecular Science major. SA: MT 485 C: BLD 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: BLD 438 R: Open to students in the Diagnostic Molecular Science major. SA: MT 486 C: BLD 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 to students in the Clinical Laboratory Sciences major or in the Diagnostic Molecular Science major or in the Lyman Briggs School-Medical Technology Coordinate Major or in the Medical Technology major. SA: MT 495
Faculty directed study including assigned readings, reviews of appropriate scientific periodicals, research, and laboratory experience.
### BLD—Biomedical Laboratory Diagnostics Program

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Description</th>
<th>Prerequisites</th>
<th>Corequisite</th>
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</thead>
<tbody>
<tr>
<td>498</td>
<td>Focused Problems in Clinical Laboratory Science</td>
<td>Equipment operation, DNA extraction and measurement, electrophoresis, hybridization and transfer, amplification and detection, including techniques and automated sequencing, clinical applications.</td>
<td>2(4-0) P: BLD 851 or concurrently SA: MT 831L, MT 832&lt;br&gt;SA: MT 831</td>
<td>SA: MT 890</td>
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<td>506</td>
<td>Hemostasis, Thrombosis and Effective Resource Management</td>
<td>Adverse transfusion outcomes (ATO) covering cause, methods of detection, monitoring paradigms and prevention.</td>
<td>3(3-0) RB: Background in hemostasis, thrombosis and blood product management. R: Open to lifelong graduate students in the Biomedical Laboratory Operations major or in the Clinical Laboratory Sciences major or approval of department.</td>
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<td>835</td>
<td>Transfusion Service Operations and Management</td>
<td>Management and operational practices needed to meet both the fiscal and regulatory oversight of a transfusion service.</td>
<td>2(2-0) P: BLD 851 SA: MT 837&lt;br&gt;SA: MT 835&lt;br&gt;SA: MT 839</td>
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<tr>
<td>836</td>
<td>Managing Biomedical Laboratory Operations</td>
<td>Integration of the roles of legislative, regulatory, technological and economic factors that influence the practice and management of biomedical laboratory operations.</td>
<td>2(0-0) P: BLD 842 SA: MT 842&lt;br&gt;SA: MT 844</td>
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<td>842</td>
<td>Topics in Biomedical Laboratory Operations</td>
<td>Current issues relevant to biomedical laboratory operations from an interdisciplinary perspective with an emphasis on efficient laboratory operations.</td>
<td>2(2-0) P: BLD 842</td>
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<td>844</td>
<td>Decision Processes for Biomedical Laboratory Operations</td>
<td>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.</td>
<td>2(0-0) P: BLD 842</td>
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<td>850</td>
<td>Concepts in Immunodiagnostics</td>
<td>Immunology principles and theory applied to diagnostic evaluation of the host immune response during health and disease.</td>
<td>2(2-0) P: BLD 842</td>
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<td>851</td>
<td>Clinical Application of Immunodiagnostic Principles</td>
<td>Immunodiagnostic theories and principles applied to clinical assay development and method evaluation.</td>
<td>2(0-0) P: BLD 842</td>
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<td>852</td>
<td>Immunodiagnostics Laboratory</td>
<td>Performance of immunopurifications, in vitro diagnostic assays and basic flow cytometry. Data analysis and quality control evaluation.</td>
<td>2(2-0) P: BLD 850 SA: MT 851L, MT 852</td>
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<td>860</td>
<td>Clinical Laboratory Diagnosis of Infectious Diseases</td>
<td>Laboratory techniques for diagnosing infectious diseases in humans. Emphasis on differential diagnosis and correlation of microbiological results with serology, hematology, and clinical chemistry.</td>
<td>2(2-0) P: BLD 850 SA: MT 851</td>
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<td>890</td>
<td>Selected Problems in Clinical Laboratory Science</td>
<td>Non-thesis research for Plan B master's students.</td>
<td>1 to 10 credits</td>
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<tr>
<td>895</td>
<td>Projects in Biomedical Laboratory Operations</td>
<td>Non-thesis research for Plan B master's students.</td>
<td>1 to 6 credits</td>
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<tr>
<td>899</td>
<td>Master's Thesis Research</td>
<td>Master's thesis research.</td>
<td>1 to 10 credits</td>
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