Medical Laboratory Science

DEGREE OFFERED

• Bachelor of Science in Medical Laboratory Science

The Degree Program

The B.S. in medical laboratory science has two areas of emphasis: Clinical laboratory science (http://www.hsc.wvu.edu/medsci) and Histotechnology (http://www.hsc.wvu.edu/histotech). Clinical laboratory scientists are healthcare professionals educated in all aspects of clinical laboratory analysis, including test development, performance, and evaluation. Clinical laboratory scientists may work in many areas, including clinical chemistry, hematology, immunohematology, immunology, clinical microbiology, and molecular diagnostics.

Histotechnologists are healthcare professionals who are qualified through academic and applied science education and training to provide service, research, and management in histotechnology and areas related to anatomic pathology. Histotechnologists are integral to the success of the anatomic pathology department by performing routine and complex procedures to preserve and process tissue specimens for examination and diagnosis by a pathologist.

Practice settings for clinical laboratory scientists and histotechnologists include hospital, clinic, public health, or private clinical laboratories; research, cytogenetic, pharmaceutical, or in-vitro fertilization laboratories; technical or sales representatives for medical manufacturers and suppliers; biotechnology, food, and cosmetic industries; and state or federal crime laboratories.

Nature of Program

Students are admitted into either the clinical laboratory science or the histotechnology area of emphasis within the medical laboratory science division after completing the pre-requisite courses at an accredited college or university. As students complete the pre-requisite courses, they may apply to the medical laboratory science area(s) of emphasis typically during the sophomore year.

Within both areas of emphasis, the junior year (the first year of the professional curriculum) includes core and area-specific courses to introduce the student to the medical sciences and to prepare for the senior year curriculum. During the senior year (the second year of the professional curriculum), the student receives both didactic instruction and practical experience. Students receive practical experience at one or more of the affiliated hospital laboratories including:

• Ruby Memorial Hospital, Morgantown, WV
• Monongalia County General Hospital, Morgantown, WV
• West Penn Allegheny Health System, Pittsburgh, PA
• WVU Eastern Division which includes City Hospital, Martinsburg, WV and Jefferson Memorial Hospital, Ranson, WV
• Veterans Affairs Medical Center, Martinsburg, WV
• Excela Health which includes Westmoreland Hospital in Greensburg, PA and Latrobe Hospital in Latrobe, PA
• Charleston Area Medical Center, Charleston, WV
• United Hospital Center, Clarksburg, WV
• St. Clair Hospital, Pittsburgh, PA

Students must provide their own transportation and housing during the clinical rotations. Students assigned to the Eastern Division will participate in the rural rotation activities at this site.

The WVU medical laboratory science areas of emphasis in clinical laboratory science and histotechnology are accredited by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS), 5600 N. River Road, Suite 720, Rosemont, IL 60018, and (773) 714-8880. Graduates of the clinical laboratory science program and the histotechnology program are eligible for certification by the Board of Certification of the American Society for Clinical Pathology (ASCP).

FACULTY

PROFESSOR AND MLS DIVISION DIRECTOR

• Beverly Kirby - Ed.D. (West Virginia University)
  Professor and Medical Laboratory Science Division Director

HTL PROGRAM DIRECTOR

• Kimberly Feaster - B.S. (University of Findlay)
ASSOCIATE PROFESSOR AND CLS MEDICAL DIRECTOR
• Peter L. Perrotta - M.D. (Pennsylvania State University)

ASSISTANT PROFESSOR AND HTL MEDICAL DIRECTOR
• Olukemi Esan - M.D. (West Virginia University)

ASSOCIATE PROFESSORS
• Abra Elkins - M.S.
• Kerry Harbert - M.A.,M.T.

ASSISTANT PROFESSOR
• Linda Corum - MS

CLINICAL INSTRUCTOR
• Jane Wade

Admission to the Pre-Medical Laboratory Science Major
Students in the pre-medical laboratory science major and direct admit students must meet the admission criteria of WVU. Pre-medical laboratory science students are advised by the University College. Medical laboratory science faculty advise direct admit students. Prospective students are advised to take mathematics, chemistry, and biology in high school.

Qualified applicants may enter the pre-medical laboratory science major at the beginning of any semester, however the professional curriculum begins the fall semester after the student is admitted to either the clinical laboratory science or histotechnology area of emphasis. Admission to the pre-medical laboratory science major does not ensure admission to the medical laboratory science areas of emphasis in clinical laboratory science or histotechnology.

Pre-medical laboratory science students apply for admission into the junior year (first year in the MLS area of emphasis professional curriculum) before the second semester of the sophomore year in college. Fulfillment of the pre-medical laboratory science curriculum does not ensure admittance into either the clinical laboratory science or the histotechnology area of emphasis.

PRE-REQUISITES

<table>
<thead>
<tr>
<th>Subject</th>
<th>Course(s)</th>
<th>Credits</th>
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<tbody>
<tr>
<td>English</td>
<td>ENGL 101 &amp; ENGL 103</td>
<td>3-6</td>
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<tr>
<td></td>
<td>Composition And Rhetoric and Rhetoric</td>
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<tr>
<td>Biology</td>
<td>BIOL 101 &amp; BIOL 103</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>General Biology &amp; General Laboratory</td>
<td>4</td>
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<tr>
<td></td>
<td>or BIOL 115</td>
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<tr>
<td></td>
<td>Principles of Biology</td>
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</tr>
<tr>
<td>Chemistry</td>
<td>CHEM 115 &amp; CHEM 116</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Fundamentals of Chemistry</td>
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</tr>
<tr>
<td></td>
<td>CHEM 233 &amp; CHEM 235</td>
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<tr>
<td></td>
<td>Organic Chemistry &amp; Laboratory</td>
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<tr>
<td>Mathematics</td>
<td>MATH 126A</td>
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<tr>
<td></td>
<td>College Algebra 5-Day</td>
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<td></td>
<td>MATH 126B</td>
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<td></td>
<td>College Algebra 4-Day</td>
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<td>MATH 126C</td>
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<td>College Algebra 3-Day</td>
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<tr>
<td>Statistics</td>
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<td></td>
<td>Elemntry Statistical Inference</td>
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</table>
or ECON 225  Elemntry Business/Economcs Stat

GEC 22-24

Credits to satisfy objectives 3.5-9.

Total Hours 66-71

*  CHEM 231 Organic Chemistry: Brief Course may be substituted for CHEM 233/235 and CHEM 234/236, however two semesters of organic chemistry are strongly recommended to better prepare for the professional curriculum.

Although not required for admission to the medical laboratory science areas of emphasis in clinical laboratory science and histotechnology, eight credits of organic chemistry, eight credits of physics, cell biology, and six credits of social sciences are suggested electives for those students interested in applying to medical, dental, or other graduate programs. In addition, a foreign language is recommended for students who plan to do graduate work.

Admission decisions are based upon the applicant’s grade point average, recommendations, interview, and documented ability to successfully complete full-time academic work. Applicants should have a minimum grade point average of 2.5 (cumulative and science). Applicants may be admitted on probation if their GPA (cumulative or science) is less than 2.5. Applicants with less than a 2.0 GPA, either cumulative or science, will not be admitted. A GPA of 2.5 or above does not necessarily ensure admission. Two letters of recommendation are required; at least one must be from a college science professor. A personal interview with the Medical Laboratory Science Admissions Committee is required. Admission of international students is in compliance with WVU regulations.

APPLICATION PROCEDURE

Each year the medical laboratory science division selects a limited number of applicants from the applications received for admission to the area of emphasis in clinical laboratory science and histotechnology. Application for admission to the medical laboratory science’s areas of emphasis is available online after December 1 at: http://admissions.wvu.edu/admissions/hsc_applicants

There is an application fee for residents and non-residents. The priority date for completing applications is February 15. The deadline is March 1 if the applicant expects to enter the program the following fall semester. If the class is not filled by those applications, the deadline may be extended until August.

GENERAL EDUCATION CURRICULUM

Please use this link to view a list of courses that meet each GEC requirement. (http://registrar.wvu.edu/current_students/general_education_curriculum)

NOTE: Some major requirements will fulfill specific GEC requirements. Please see the curriculum requirements listed below for details on which GECs you will need to select.

<table>
<thead>
<tr>
<th>General Education Curriculum</th>
<th>Composition And Rhetoric</th>
<th>3-6</th>
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<tbody>
<tr>
<td>ENGL 101</td>
<td>&amp; ENGL 102</td>
<td>3-6</td>
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<tr>
<td>or ENGL 103</td>
<td>or ENGL 103</td>
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<tr>
<td>GEC 2A - Mathematics</td>
<td>Accelerated Academic Writing</td>
<td>3-4</td>
</tr>
<tr>
<td>GEC 2B - Natural and Physical Science</td>
<td>7-8</td>
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</tr>
<tr>
<td>GEC 2C - Additional GEC 2A, B or C</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>GEC 3 - The Past and Its Traditions</td>
<td>3</td>
<td></td>
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<tr>
<td>GEC 4 - Issues of Contemporary Society</td>
<td>3</td>
<td></td>
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<tr>
<td>GEC 5 - Artistic Expression</td>
<td>3</td>
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<tr>
<td>GEC 6 - The Individual in Society</td>
<td>3</td>
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</tr>
<tr>
<td>GEC 6F - First Year Seminar</td>
<td>1-3</td>
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<tr>
<td>GEC 7 - American Culture</td>
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<tr>
<td>GEC 8 - Western Culture</td>
<td>3</td>
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<tr>
<td>GEC 9 - Non-Western Culture</td>
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</table>

Total Hours 38-45

Pre-Medical Laboratory Sciences Suggested Plan of Study

<table>
<thead>
<tr>
<th>First Year</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
</tr>
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<tbody>
<tr>
<td>Fall</td>
<td></td>
<td>CHEM 115</td>
<td></td>
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<tr>
<td>CHEM 115</td>
<td>4</td>
<td>CHEM 116</td>
<td>4</td>
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</table>
Select one of the following: 3 ENGL 101 3
MATH 126A
MATH 126B
MATH 126C
Select one of the following: 4 BIOL 101
& BIOL 104
& BIOL 117
Select one of the following: 4 GEC
BIOL 101
& BIOL 103
BIOL 115
GEC
PATH 100 (Graded Pass/Fail)** 1

<table>
<thead>
<tr>
<th>Second Year</th>
<th>Fall</th>
<th>Hours</th>
<th>Spring</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGL 102</td>
<td>3 CHEM 234</td>
<td>4</td>
<td>&amp; CHEM 236</td>
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<tr>
<td>STAT 211 or ECON 225</td>
<td>3 PATH 200**</td>
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<td></td>
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<tr>
<td>CHEM 233</td>
<td>4 GEC</td>
<td>9</td>
<td></td>
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<tr>
<td>&amp; CHEM 235</td>
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<tr>
<td>GEC</td>
<td></td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PATH 201 (Graded Pass/Fail)**</td>
<td>1</td>
<td>16</td>
<td>15</td>
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</tbody>
</table>

Total credit hours: 64

* CHEM 231 Organic Chemistry: Brief Course may be substituted for CHEM 233/235 and CHEM 234/236, however two semesters of organic chemistry are strongly recommended to prepare for the professional curriculum.

** PATH 100, PATH 101, PATH 200, and PATH 201 are required for Direct Admit students and highly recommended for Pre-Medical Laboratory Science students.

### Required Core Curriculum for Medical Laboratory Science Major

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MICB 323</td>
<td>Medical Microbiology/Lab</td>
<td>5</td>
</tr>
<tr>
<td>PATH 300</td>
<td>Introduction to Pathology</td>
<td>3</td>
</tr>
<tr>
<td>PATH 303</td>
<td>Clinical Lab Applications</td>
<td>2</td>
</tr>
<tr>
<td>PATH 320</td>
<td>Basic Clinical Biochemistry</td>
<td>3</td>
</tr>
<tr>
<td>PATH 380</td>
<td>Introduction to Immunology</td>
<td>1</td>
</tr>
<tr>
<td>PATH 381</td>
<td>Resrch/Educational Methodology</td>
<td>2</td>
</tr>
<tr>
<td>PATH 403</td>
<td>Community Service Practicum</td>
<td>1</td>
</tr>
<tr>
<td>PATH 465</td>
<td>Medical Laboratory Management</td>
<td>2</td>
</tr>
<tr>
<td>PATH 475</td>
<td>Medical Relevance - Capstone</td>
<td>3</td>
</tr>
<tr>
<td>PSIO 441</td>
<td>Mechanisms Body Function</td>
<td>4</td>
</tr>
</tbody>
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Total Hours 26

### Required Courses for Clinical Laboratory Science Area of Emphasis

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PATH 310</td>
<td>Clinical Laboratory Mycology</td>
<td>1</td>
</tr>
<tr>
<td>PATH 329</td>
<td>Clinical Chemistry 1</td>
<td>2</td>
</tr>
<tr>
<td>PATH 340</td>
<td>Introduction to Hematology</td>
<td>3</td>
</tr>
<tr>
<td>PATH 401</td>
<td>Phlebotomy</td>
<td>1</td>
</tr>
<tr>
<td>PATH 420</td>
<td>Immunology and Blood Banking</td>
<td>3</td>
</tr>
<tr>
<td>PATH 421</td>
<td>Immunohematology/Blood Bank Lab</td>
<td>3</td>
</tr>
<tr>
<td>PATH 430</td>
<td>Clinical Chemistry 2</td>
<td>3</td>
</tr>
<tr>
<td>PATH 431</td>
<td>Clinical Chemistry Laboratory</td>
<td>3</td>
</tr>
<tr>
<td>PATH 440</td>
<td>Clinical Hematology</td>
<td>3</td>
</tr>
<tr>
<td>PATH 441</td>
<td>Clinical Hematology Laboratory</td>
<td>3</td>
</tr>
</tbody>
</table>
### Required Courses for Histotechnology Area of Emphasis

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>NBAN 205</td>
<td>Introduction to Human Anatomy</td>
<td>3</td>
</tr>
<tr>
<td>NBAN 206</td>
<td>Human Anatomy Laboratory</td>
<td>1</td>
</tr>
<tr>
<td>PATH 200</td>
<td>Medical Terminology</td>
<td>3</td>
</tr>
<tr>
<td>PATH 304</td>
<td>Histotechnology Microanatomy</td>
<td>3</td>
</tr>
<tr>
<td>PATH 305</td>
<td>Staining Techniques 1</td>
<td>4</td>
</tr>
<tr>
<td>PATH 306</td>
<td>Histotechnique 1</td>
<td>3</td>
</tr>
<tr>
<td>PATH 405</td>
<td>Staining Techniques 2</td>
<td>4</td>
</tr>
<tr>
<td>PATH 406</td>
<td>Histotechnique 2</td>
<td>3</td>
</tr>
<tr>
<td>PATH 407</td>
<td>Histology Laboratory</td>
<td>8</td>
</tr>
<tr>
<td>PATH 408</td>
<td>Histotechnologist Practicum</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total Hours</strong></td>
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<td><strong>42</strong></td>
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</table>

### Graduation Requirements

**JUNIOR YEAR**

Students must maintain a minimum grade point average of 2.0 throughout the program. Failure to maintain at least a 2.0 GPA may result in disciplinary sanctions. The Academic and Professional Standards Committee must recommend any student for advancement to the senior year. A satisfactory GPA does not ensure advancement.

**SENIOR YEAR**

Students receive didactic and clinical instruction during the senior year which includes summer, fall, and spring semesters. Students must maintain a minimum grade point average of 2.0 for each semester of the senior year. Graduation requires satisfactory completion of all academic work and the recommendation of the faculty of the School of Medicine. All first degree students are required to complete a total of 125 semester hours for the BS in MLS degree. Any competencies not completed must be made up by the end of the school year (mid-May) or graduation may be delayed. Graduation is not dependent upon passing a national certification examination.

### COURSES

**PATH 100. Medical Laboratory Science. 1 Hour.**

Introduction to the profession of medical laboratory science and medical laboratory specialties. (Pass/Fail grading only).

**PATH 101. Medical Laboratory Science 2. 1 Hour.**

Continuation of PATH 100. (Pass/Fail grading only).

**PATH 200. Medical Terminology. 3 Hours.**

General medical terminology with emphasis on clinical and anatomic pathology terminology.

**PATH 201. Basic Medical Lab Science. 1 Hour.**

Basic techniques for the medical science laboratory and current issues related to the medical laboratory science profession. (Pass/Fail grading only).

**PATH 300. Introduction to Pathology. 3 Hours.**

A study of principles and processes of pathology from cellular to system, including etiology, pathogenesis, and clinical features of representative or commonly occurring disorders and diseases.

**PATH 301. Basic Pathology. 2 Hours.**

PR: Enrollment in dental hygiene or physical therapy, or consent. A study of the basic pathologic processes in man.

**PATH 302. Oral Pathology. 3 Hours.**

PR: PATH 301, and dental hygiene major, or consent. Application of fundamental knowledge of general pathology to pathological conditions that occur in the oral cavity.
PATH 303. Clinical Lab Applications. 2 Hours.
Lectures and laboratory experience on laboratory safety, measurement, use and maintenance of laboratory equipment, preparation, and storage of reagents and solutions, and basic laboratory techniques.

PATH 304. Histotechnology Microanatomy. 3 Hours.
Microscopic identification of the morphology of human cells, tissues and organ systems with relationship to structure and function.

PATH 305. Staining Techniques 1. 4 Hours.
A lecture and laboratory course focusing on the theory and methodology of routine and special staining and the basic principles, components and use of instruments in the histopathology laboratory.

PATH 306. Histotechnique 1. 3 Hours.
A lecture and laboratory course focusing on the principles and theories of routine histologic techniques and the basic principles, components and use of instruments in the histopathology laboratory.

PATH 310. Clinical Laboratory Mycology. 1 Hour.
How to isolate and identify the more commonly encountered pathogenic fungi as well as those fungi frequently seen as laboratory contaminants. The course will include basic taxonomy, isolation procedures, and identifying characteristics.

PATH 320. Basic Clinical Biochemistry. 3 Hours.
Introduction to basic biochemistry and human metabolism of amino acids, proteins, enzymes, carbohydrates, liquids, and nucleotides. Molecular biology and applications to the clinical laboratory are included.

PATH 323. Medical Microbiology Lab. 2 Hours.
PR: MICB 200. (For medical laboratory science students; other students with consent.) Emphasis is on clinical laboratory techniques and laboratory identification of pathogenic microorganisms.

PATH 329. Clinical Chemistry 1. 2 Hours.
Lectures in clinical chemistry analysis, clinical significance, clinical instrumentation, and implications of diagnosis.

PATH 340. Introduction to Hematology. 3 Hours.
Lectures and laboratory sessions to cover structure, morphology, and function of the cells of the blood, bone marrow and body fluids, with an overview of hematologic abnormalities.

PATH 381. Research/Educational Methodology. 2 Hours.
Lectures in ethics, techniques of research, and techniques of educational methodology for medical laboratory science students.

PATH 401. Phlebotomy. 1 Hour.
PR: PATH 303. Clinical laboratory practice, including venipuncture, finger sticks, and heel sticks; isolation, universal precautions and other safety techniques are included.

PATH 403. Community Service Practicum. 1 Hour.
PR: Senior year in medical laboratory science. Students will participate in approved community service activities. (Grading will be pass/fail.)

PATH 405. Staining Techniques 2. 4 Hours.
PR: PATH 305. A lecture and laboratory course focusing on the theory and methodology of immunohistochemistry.

PATH 406. Histotechnique 2. 3 Hours.
PR: PATH 306. A lecture and laboratory course focusing on the principles and theories of routine and advanced histologic techniques and the basic principles, components and use of instruments in the histopathology laboratory.

PATH 407. Histology Laboratory. 8 Hours.
This course consists of rotations in clinical and research histopathology. (Grading will be Pass/Fail).

PATH 408. Histotechnologist Practicum. 10 Hours.
Students will utilize their knowledge in routine and advanced histological techniques in a clinical setting.

PATH 420. Immunology and Blood Banking. 3 Hours.
Lectures on immunochemistry and blood banking theory and practice.

PATH 421. Immunohematology/Blood Bank Lab. 3 Hours.
Clinical laboratory practice in blood banking procedures. Emphasis on procedures required for collection and preparation of blood and blood components for transfusion, special techniques, antibody studies, and problem solving.

PATH 430. Clinical Chemistry 2. 3 Hours.
PR: MTEC 329 or PATH 329. Continuation of PATH 329, includes laboratory practice in methods of measurement.

PATH 431. Clinical Chemistry Laboratory. 3 Hours.
PR: PATH 329 and PATH 420. Application of clinical chemistry principles to laboratory medicine, to include routine and specialized procedures, specimen and result evaluation, and problem solving.
PATH 440. Clinical Hematology. 3 Hours.
Lectures in hematologic theory and practice, including coagulation and body fluids laboratory.

PATH 441. Clinical Hematology Laboratory. 3 Hours.
Application of hematologic principles to laboratory medicine, including coagulation, urinalysis, and body fluids. Emphasis on routine and specialized procedures, evaluations, and problem solving.

PATH 450. Clinical Microbiology. 3 Hours.
Presentation and discussion of methodologies employed in the processing of clinical microbiology specimens, isolation, and identification of clinically significant microorganisms, and determination of antimicrobial susceptibilities with laboratory.

PATH 451. Clinical Microbiology Lab. 3 Hours.
Practice in the clinical microbiology laboratory to include isolation and identification of microorganisms, processing of specimens and antibiograms.

PATH 465. Medical Laboratory Management. 2 Hours.
Laboratory organization and principles of laboratory management.

PATH 470. Clinical Microscopy. 1 Hour.
The analysis of body fluids (urine, fluids, etc.) for abnormalities.

PATH 472. Urinalysis and Body Fluids Lab. 1 Hour.
PR OR CONC: PATH 470 or Consent. Clinical Laboratory principles and procedures used in analysis of urine and body fluids.

PATH 475. Medical Relevance - Capstone. 3 Hours.
Case studies of pathologic entities encountered in the medical laboratory and a review of medical laboratory science. Student will complete and give an oral presentation of the Capstone experience and pass a comprehensive examination.

PATH 480. Clinical Immunology. 2 Hours.
PR: Open only to MLS majors. Lectures in principles of immunological and serological procedures, immunological diseases, and significance of laboratory methods for diagnosis.

PATH 481. Clinical Immunology Laboratory. 1 Hour.
Clinical laboratory practice in immunological procedures. Emphasis on basic serological techniques, protein analysis, molecular methods, and tissue typing.

PATH 490. Teaching Practicum. 1-3 Hours.
PR: Consent. Teaching practice as a tutor or assistant.

PATH 491. Professional Field Experience. 1-18 Hours.
PR: Consent. (May be repeated up to a maximum of 18 hours.) Prearranged experiential learning program, to be planned, supervised, and evaluated for credit by faculty and field supervisors. Involves temporary placement with public or private enterprise for professional competence development.

PATH 493A-Z. Special Topics. 1-6 Hours.
PR: Consent. Investigation of topics not covered in regularly scheduled courses.

PATH 494A-Z. Seminar. 1-3 Hours.
PR: Consent. Presentation and discussion of topics of mutual concern to students and faculty.

PATH 495. Independent Study. 1-6 Hours.
Faculty supervised study of topics not available through regular course offerings.

PATH 496. Senior Thesis. 1 Hour.
PR: Consent.

PATH 498A-Z. Honors. 1-3 Hours.
PR: Students in the Honors Program and consent by the honors director. Independent reading, study, or research.

PATH 520. Seminars-Molecular Diagnostics. 1 Hour.
This course provides an overview of molecular diagnostic theory and procedures.

PATH 601. Special Studies:Oral Pathology. 1-3 Hours.
PR: PATH 738 and PATH 753. Advanced study of local or systemic disease processes affecting oral structures through seminars, assignment of specific topics, or research activities.

PATH 603. Pathology & Anatomy. 6 Hours.
This course will cover gross and microscopic human anatomy including embryology, histology and microanatomy lab.

PATH 605. Advanced Microanatomy. 2 Hours.
Microanatomy of disease states including clinical correlations for students in the pathologists assistant program.

PATH 610. Pathology Assistant Educ Mthds. 1 Hour.
Techniques in educational methodology for pathologist's assistants.

PATH 620. Clinical Pathology Seminar. 2 Hours.
This course presents a review of clinical pathology, including pertinent forensic molecular, toxicologic and radiologic diagnostics.
PATH 625. Anatomical Pathology Techniques. 4 Hours.
This course will cover standard techniques in surgical and autopsy dissection, preparation of reports, basic forensic, investigation techniques, and basic histological and immunological staining techniques.

PATH 627. Pathology Assistant Practicum 1. 9 Hours.
Rotations in surgical and autopsy pathology to include forensics and pediatrics.

PATH 628. Pathology Assistant Practicum 2. 9 Hours.
Rotations in surgical and autopsy pathology to include forensics and pediatrics.

PATH 629. Pathologist Assistant Practicum 3. 7 Hours.
PR: PATH 628. This course is a continuation of PATH 628 and advanced procedures and application of advanced techniques in surgical and autopsy pathology.

PATH 630. Pathology Review 1. 2 Hours.
This course includes an intense review of clinical and anatomical pathology theory and techniques, and presentation of scientific journal articles and clinical cases.

PATH 631. Pathology Review 2. 2 Hours.
PR: PATH 630. This course is a continuation of PATH 630 and includes an intense review of clinical and anatomical pathology theory and techniques, and presentation of journal articles and clinical cases.

PATH 693A-Z. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

PATH 728. General Pathology. 5 Hours.
PR: Consent. A study of the pathophysiological changes associated with human disease and a study of disease of major organ systems.

PATH 738. Oral Pathology 1. 3 Hours.
PR: PATH 738 or consent.

PATH 753. Oral Pathology 2. 2 Hours.
PR: PATH 738 or consent.

PATH 755. Clinicopathologic Correlation. 1 Hour.
PR: PATH 738 and PATH 753 or consent. Histopathologic correlation with clinical case histories and presenting signs and symptoms presented in a case-based learning format.

PATH 782. Oral Histopathology. 1.2 Hour.
PR: PATH 738 and PATH 753 or consent. An elective seminar stressing the significant microscopic features and diagnosis of various oral lesions.

PATH 790. Teaching Practicum. 1-3 Hours.
PR: (PATH 301 and PATH 302) or (PATH 728 and PATH 738 and PATH 753.) Supervised practice in college teaching of pathology. Note: This course is intended to insure that graduate assistants are adequately prepared and supervised when they are given college teaching responsibility. It will also present a mechanism for students not on assistantships to gain teaching experience. (Grading will be P/F.).

PATH 791A-Z. Advanced Topics. 1-6 Hours.
PR: Consent. Investigation of advanced topics not covered in regularly scheduled courses.

PATH 792A-Z. Directed Study. 1-6 Hours.
Directed study, reading, and/or research.

PATH 793A-Z. Special Topics. 1-6 Hours.
A study of contemporary topics selected from recent developments in the field.

PATH 794A-Z. Seminar. 1-6 Hours.
Special seminars arranged for advanced graduate students.

PATH 795. Independent Study. 1-9 Hours.
Faculty supervised study of topics not available through regular course offerings.

PATH 796. Graduate Seminar. 1 Hour.
PR: Consent. Each graduate student will present at least one seminar to the assembled faculty and graduate student body of his or her program.

PATH 797. Research. 1-15 Hours.
PR: Consent. Research activities leading to thesis, problem report, research paper or equivalent scholarly project, or a dissertation. (Grading may be S/U.)

PATH 798. Dissertation. 1-6 Hours.
PR: Consent. This is an optional course for programs that wish to provide formal supervision during the writing of student reports (698), or dissertations (798). Grading is normal.
PATH 799. Graduate Colloquium. 1-6 Hours.
PR: Consent. For graduate students not seeking coursework credit but who wish to meet residency requirements, use the University’s facilities, and participate in its academic and cultural programs. Note: Graduate students who are not actively involved in coursework or research are entitled, through enrollment in their department’s 699/799 Graduate Colloquium to consult with graduate faculty, participate in both formal and informal academic activities sponsored by their program, and retain all of the rights and privileges of duly enrolled students. Grading is P/F; colloquium credit may not be counted against credit requirements for masters programs. Registration for one credit of 699/799 graduate colloquium satisfies the University requirement of registration in the semester in which graduation occurs.

PATH 801. Mechanisms of Human Disease. 11 Hours.
Integrated study of disease using structure-function relationships. This course includes the structural, biochemical, and functional changes in cells, tissues, and organs that underlie disease.