This is the Curriculum and Courses section of the 1997-1999 University of Minnesota Medical Technology Bulletin.
Liberal Education Requirements

Effective for all freshmen with fewer than 39 credits enrolling from fall 1994 to summer session II 1996. Beginning fall 1996, the liberal education requirements apply to all students entering a baccalaureate degree program, regardless of prior credits.

A liberal education introduces you to the modes of inquiry and subject matter of the major branches of knowledge, including the factual information and theoretical or artistic constructs that form their foundations; the “ways of knowing”—the kinds of questions asked and how insight, knowledge, and data are acquired and used; the changes over time of their central ideas or expressive forms; and the interrelationships among them and with human society in general. To these ends, study by all undergraduate students on the Twin Cities campus is guided by a common framework.

The Diversified Core Curriculum

Physical and Biological Sciences. Comprehension of physical and biological principles; understanding of and ability to use the methods of scientific inquiry—the ways in which scientists investigate physical and biological phenomena; and appreciation of the importance of science and the value of a scientific perspective.

Requirement: A minimum of three courses totaling at least 12 credits, including one course with a laboratory or field experience in the physical sciences and one course with a laboratory or field experience in the biological sciences.

History and Social Sciences. Knowledge of how historians and social scientists describe and analyze human experiences and behavior; study of the interrelationships among individuals, institutions, structures, events, and ideas; understanding of the roles individuals play in their historical, cultural, social, economic, and political worlds.

Requirement: A minimum of three courses totaling at least 12 credits, including one course with historical perspective.

Arts and Humanities. Understanding of approaches to the human condition through works of art, literature, and philosophy; knowledge of how artists create and humanistic scholars think; ability to make aesthetic judgments.

Requirement: A minimum of three courses totaling at least 12 credits including courses in two of the following: literature, philosophical perspective, and visual or performing arts.

Mathematical Thinking. Acquisition of mathematical modes of thinking; ability to evaluate arguments, detect fallacious reasoning, and evaluate complex reasoning chains; appreciation of the breadth of applications of mathematics and its foundations.

Requirement: A minimum of one course totaling at least four credits.

The Designated Themes of Liberal Education

The designated themes of liberal education offer a dimension to liberal learning that complements the diversified core curriculum. Each of the themes focuses on an issue of compelling importance to the nation and the world, the understanding of which is informed by many disciplines and interdisciplinary fields of knowledge.

Requirement: A minimum of six courses (or five courses if one includes an approved practicum), including one course in each of the following:

Cultural Diversity. Understanding of the roles gender, ethnicity, and race play in structuring the human experience in and developing the social and cultural fabric of the United States.

International Perspectives. Comprehension of the ways in which you are part of a rapidly changing global environment dominated by the internationalization of most human endeavors.

Environment. Knowledge of the interaction and interdependence of the biophysical systems of the natural environment and human social and cultural systems.

Citizenship and Public Ethics. Reflection on and determination of a clearer sense of your present and future civic relationships and your obligations to the community.

Writing Skills

The ability to communicate effectively is a hallmark of a liberally educated individual and a key to a successful and satisfying life. To encourage refining of writing skills, the liberal education curriculum includes both writing courses and writing across the curriculum.

Requirement: Writing skills requirements are being revised. Until the new requirements are in effect, all students will complete the writing requirement specified by the college awarding their baccalaureate degree.

You may satisfy the liberal education requirements with a number of courses and credits different from those of other students because some courses serve multiple goals in the curriculum; e.g., some courses will satisfy a diversified core requirement and a designated theme requirement, and other courses will satisfy the requirements for each of two themes. Thus, you may satisfy the designated theme requirements with a smaller number of courses than is stated in the requirement. Each quarter, the Class Schedule will publish the requirements and list all courses that satisfy them. In addition, the Class Schedule will list which of these courses are offered that quarter and which are tentatively scheduled for the subsequent quarters during the academic year.

Minnesota Transfer Curriculum

If you complete the Minnesota Transfer Curriculum at any participating Minnesota college or university, you fulfill the University’s Twin Cities campus liberal education requirements. However, you will still need to complete a portion of the writing skills requirements. Contact your college advising office concerning these requirements. For more information on using transfer credits for the liberal education requirements, contact the Office of Admissions (612/625-2008).
Curricular Requirements

Bachelor of Science Program

To help students achieve a liberal education, the Division of Medical Technology expects each student to distribute some part of his or her coursework in areas of study outside the major. To integrate the goals of both a liberal and professional education in a manner appropriate to a baccalaureate curriculum in medical technology, the program emphasizes vigorous training in the biological and physical sciences, with special emphasis on acquiring a knowledge of biology and chemistry that is basic to all facets of laboratory science. The program includes not only scientific information and technical skills but also the development of professional and caring attitudes and a commitment to lifelong learning.

In addition to prerequisite courses, liberal education courses are required. They do not have to be completed during the preprofessional years. Consult the Class Schedule for a complete listing of courses commonly used to meet liberal education requirements.

Students applying to the Division of Medical Technology who will be earning their second baccalaureate degree are not required to meet University of Minnesota liberal education requirements.

Diversified Core

- Physical and biological sciences, 12-cr minimum, must include one laboratory course.
- History and social science, three courses, 12-cr minimum.
  One course must be in a historical perspective category.
- Arts and humanities, three courses, 12-cr minimum.
- Mathematical thinking, one course, 4-cr minimum.

Designated Themes

Six courses from the following:

- cultural diversity
- international relations
- citizenship and public ethics
- environment

Writing Skills

See page 16.

Preprofessional Program—Students register in the College of Liberal Arts (CLA) or another comparable college for the preprofessional program. The following courses or their equivalents must be completed before admission to the professional program. (Quarter credits are indicated in parentheses.)

- CBN 3001—Elementary Anatomy (4) and CBN 3005—Anatomy Laboratory (1)
- Biol 1009—General Biology (5)
- Chem 1051-1052—General Principles of Inorganic Chemistry (8)
- Chem 3301-3302—Organic Chemistry (8) (lecture)
- Chem 3305-3306—Organic Chemistry Laboratory (4)
- Completion of the freshman composition requirement as defined by CLA.
- HSU 5210—Terminology of the Health Sciences (2) strongly recommended.
- Math 1051 or Math 1251—Calculus (4) or Stat 3011—Statistical Analysis (8) (two courses from these four)
- MedT 1010—Orientation in Medical Technology (1) (optional, but recommended)
- Phys 1041-1042—Introductory Physics (10)
- Electives satisfying liberal education requirements to total 90 credits.

Other courses that are equivalent or more comprehensive may be substituted for the required courses. Students planning to pursue graduate programs or medical school should take three quarters of calculus and a higher-level physics. Students should also complete the freshman composition requirement in their first year.

Students who transfer into the preprofessional program are exempted from the MedT 1010 course. The credit earned in this course does not count toward a B.S. degree.

The following program schedule is suggested for the preprofessional years (credits in parentheses):

<table>
<thead>
<tr>
<th>FIRST YEAR</th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gen Chem 1051 (4)</td>
<td>Eng Comp 1011 (5)</td>
<td>Biol 1009 (5)</td>
</tr>
<tr>
<td></td>
<td>Core elective</td>
<td>Gen Chem 1052 (4)</td>
<td>Core elective</td>
</tr>
<tr>
<td></td>
<td>Math 1031 or 1051 or 1251</td>
<td>Core elective</td>
<td>Core elective</td>
</tr>
<tr>
<td></td>
<td>MedT 1010 (1) recommended</td>
<td>Elective</td>
<td>Elective</td>
</tr>
<tr>
<td>SECOND YEAR</td>
<td>Chem 3301 (4)</td>
<td>Chem 3302 (4)</td>
<td>CBN 3001/3003 (5) (Anat)</td>
</tr>
<tr>
<td></td>
<td>Chem 3305 (2)</td>
<td>Chem 3306 (2)</td>
<td>Stat 3011 (4)</td>
</tr>
<tr>
<td></td>
<td>HSU 5210 (2)</td>
<td>Phys 1042 (5)</td>
<td>Core elective</td>
</tr>
<tr>
<td></td>
<td>Phys 1041 (5)</td>
<td>Core/theme electives</td>
<td></td>
</tr>
</tbody>
</table>

Note: To complete the prerequisites in two years, elective courses must satisfy both a diversified core and a designated theme.
CURRICULUM AND COURSES

Professional Program—Students register in the Division of Medical Technology for the professional program. The following courses must be completed to satisfy requirements for graduation. (Quarter credits are indicated in parentheses.)

- **Biol 5003** — Genetics (4)
- **MdBc 5300, 5301** — Biochemistry (7)
- **MedT 5010** — Introduction to Clinical Laboratory Science (2)
- **MedT 5064, 5065** — Introduction to Clinical Immunohematology (5) (lecture and laboratory)
- **MedT 5077, 5078** — Hematology, Hemostasis/Instrumentation (6)
- **MedT 5080** — Seminar: Specialty Rotations (1)
- **MedT 5082** — Applied Clinical Chemistry (4)
- **MedT 5084** — Applied Clinical Virology (1)
- **MedT 5085** — Applied Clinical Hematology (4)
- **MedT 5086** — Applied Clinical Immunohematology (4)
- **MedT 5088** — Applied Diagnostic Microbiology (4)
- **MedT 5089** — Specialty Rotation (1)
- **MedT 5100** — Virology/Mycology/Parasitology (3) (lecture)
- **MedT 5102** — Principles of Diagnostic Microbiology (5)
- **MedT 5127** — Introduction to Management and Education (1)
- **MedT 5310** — Clinical Chemistry I (2)
- **MedT 5311** — Clinical Chemistry I—Laboratory Applications (2)
- **MedT 5320** — Clinical Chemistry II (2)
- **MedT 5321** — Clinical Chemistry II—Laboratory Applications (2)
- **MedT 5330** — Clinical Chemistry III (2)
- **MedT 5331** — Clinical Chemistry III—Laboratory Applications (2)
- **MedT 5765** — Hematology Morphology (4)
- **Phsl 3051** — Human Physiology (5)
- **VPB 3103** — General Microbiology (5)

Electives

- **LaMP 5177** — Pathology (4) strongly recommended
- **MicB 5218** — Immunology (3) recommended
- **MedT 5090** — Honors Program in Laboratory Methods (1-2)
- **MedT 5092** — Honors Program in Laboratory Methods (5)

Other courses in communications, economics, business, and computer science are recommended but not required.

The clinical courses (MedT 5082, 5084, 5085, 5086, 5088, and 5089) consist of applying basic methods and techniques in chemistry, virology, hematology, immunohematology, microbiology, and a specialty in the clinical laboratories of the Fairview-University Medical Center and other affiliated institutions. These clinical courses are usually offered fall and winter quarters and on a space-available basis during summer terms. Assignment to these courses is made on an individual basis; GPA is a criterion.

A minimum grade of C is required in each introductory course in order to enroll in each related clinical course. The introductory and related clinical courses are:

**Introductory Courses**
- **MedT 5064, 5065**
- **MedT 5077, 5078, 5765**
- **MedT 5310, 5311, 5320, 5321, 5330, 5331**
- **MedT 5100, 5102**
- **MedT 5080**
- **MedT 5084, 5088**

**Related Clinical Courses**
- **MedT 5010, 5077**
- **MedT 5127**
- **MedT 5064/5065**
- **MedT 5077**
- **MedT 5080**
- **MedT 5082**
- **MedT 5100, 5102**
- **MedT 5084, 5088**

Registration in University College courses concurrently with clinical courses requires the consent of the Division of Medical Technology’s Student Concerns Committee. A maximum of five quarter/semester credits may be taken in University College concurrently with the clinical courses.

The following program schedule is suggested for the professional years (credits in parentheses):

<table>
<thead>
<tr>
<th></th>
<th>Fall</th>
<th>Winter</th>
<th>Spring</th>
<th>Summer Session</th>
</tr>
</thead>
<tbody>
<tr>
<td>THIRD</td>
<td>Biochem 5300 (4)</td>
<td>Biochem 5301 (3)</td>
<td>LaMP 5177 (4)</td>
<td>No courses</td>
</tr>
<tr>
<td>YEAR</td>
<td>Comp 3033 (4)</td>
<td>Bio 5003 (4)</td>
<td>VPB 3103 (5) (Micro)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Phsl 3051 (5)</td>
<td>Theme elective</td>
<td>Theme elective</td>
<td></td>
</tr>
<tr>
<td>YEAR</td>
<td>MedT 5077 (3)</td>
<td>MedT 5078 (3)</td>
<td>MedT 5765 (4)</td>
<td>rotations (8-9)</td>
</tr>
<tr>
<td></td>
<td>MedT 5102 (5)</td>
<td>MedT 5100 (3)</td>
<td>MedT 5330 (2)</td>
<td>(if available)</td>
</tr>
<tr>
<td></td>
<td>MedT 5310 (2)</td>
<td>MedT 5080 (1)</td>
<td>MedT 5331 (2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>MedT 5311 (2)</td>
<td>MedT 5320 (2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>MedT 5321 (2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIFTH</td>
<td>Clinical</td>
<td>Clinical</td>
<td>Clinical</td>
<td>Clinical</td>
</tr>
<tr>
<td>YEAR</td>
<td>rotations (8-9)</td>
<td>rotations (8-9)</td>
<td>rotations</td>
<td>rotations (only if needed)</td>
</tr>
</tbody>
</table>
Master of Science Program

Graduate work in clinical laboratory science is available for qualified candidates who wish to prepare for a career of research, teaching, or work in industry. The master of science degree program in clinical laboratory science is offered by the Graduate School. The program is offered only under the Graduate School Plan A (master’s degree with thesis). Each student must complete a thesis involving independent research in one of the subareas of this field under the direction of an adviser.

Admission requirements include a bachelor’s degree from an accredited institution of higher learning with sufficient scholarly attainment in medical technology or chemistry and the biological sciences to justify graduate work in these areas.

More information about the program is available in the Graduate School Bulletin. For detailed information, contact Claire Bjorklund, Graduate Programs Coordinator, Box 609 Mayo, 420 Delaware Street S.E., Minneapolis, MN 55455 (612/625-8952).

Using the Course Descriptions

The course descriptions in this bulletin are primarily for courses offered by the Division of Medical Technology and taught by members of the program faculty or cooperating faculty from other educational units of the University. Meeting hours, days, and rooms for these courses are listed in the quarterly Class Schedule.

For complete listings and descriptions of courses taught by other educational units of the University, see the bulletins of those units.

Course Numbers and Symbols—Courses primarily for freshmen and sophomores are numbered 1000 through 1998; for juniors and seniors, 3000 through 3998; for juniors, seniors, and graduate students, 5000 through 5998. Courses numbered 8000 and above are open only to graduate students. The following symbols are used throughout the descriptions:

, ............ The comma, used in prerequisite listings, means “and.”
† ......... All courses preceding this symbol must be completed before credit will be granted for any quarter of the sequence.
§ ......... Credit will not be granted if credit has been received for the course listed after this symbol.
¶ ......... Concurrent registration is required (or allowed) in the course listed after this symbol.
# ......... Approval of the instructor is required for registration.
Δ ........ Approval of the department offering the course is required for registration.

A prerequisite course listed by number only (e.g., prereq 5246) is in the same department as the course being described.

A hyphen between course numbers (e.g., 3142-3143-3144) indicates a sequence of courses that must be taken in the order listed.

A comma between course numbers (e.g., 1234, 1235, 1236) indicates a series of courses that may be entered any quarter.

Medical Technology Courses (MedT)

MedT 1010. Orientation in Medical Technology. (1 cr [no cr toward degree]) Orientation to the medical technology (clinical laboratory science) profession.


MedT 5065. Introduction to Clinical Immunohematology. (2 cr) Lab exercises illustrating basic techniques used in blood banking and immunology.


MedT 5078. Hematology II: Hemostasis/Instrumentation. (3 cr; prereq 5077) Theory and application of basic principles and techniques in hemostasis and hematology instrumentation. Lecture and lab.

MedT 5080. Seminar: Specialty Rotations. (1 cr; prereq regis professional MedT program) Presentations describing each lab offering specialty rotations. For seniors planning their clinical rotation programs.

MedT 5082. Applied Clinical Chemistry. (4 cr; prereq 5310, 5311, 5320, 5321, 5330, 5331) Application of basic methods and techniques in clinical chemistry in the lab.

MedT 5084. Applied Clinical Virology. (1 cr; prereq 5064, 5065, 5100, 5102) Application of basic methods and techniques in the virology lab.

MedT 5085. Applied Clinical Hematology. (4 cr; prereq 5077, 5078, 5765) Application of methods and techniques in clinical hematology, morphology, and hemostasis.
CURRICULUM AND COURSES

MedT 5086. Applied Clinical Immunohematology. (4 cr; prereq 5064, 5065)
Application of basic techniques and methods in blood banking and immunology in the clinical laboratory. Blood grouping, compatibility testing, and immunologic procedures.

MedT 5088. Applied Diagnostic Microbiology. (4 cr; prereq 5100, 5102)

MedT 5089. Specialty Rotation. (1 cr; prereq completion of MedT preclinical professional courses)
One-week clinical rotation in a specialty lab such as immunophenotyping, cytogenetics, surgical pathology, molecular diagnostics, advanced virology, or advanced coagulation.

MedT 5090. Special Laboratory Methods. (1-2 cr)
Assignment on an individual basis to one of a wide variety of special areas of experience in the clinical laboratory.

MedT 5092. Honors Program in Laboratory Methods. (5 cr)
Individual assignment to special projects or research with more intensive treatment in one of the clinical areas of chemistry, hematology, immunohematology, or microbiology.

MedT 5100. Virology/Mycology/Parasitology for Medical Technologists. (3 cr; prereq VPB 3103 or equiv)
Basic aspects of lab diagnosis of viral, fungal, and parasitic infections. Lecture.

MedT 5102. Principles of Diagnostic Microbiology. (5 cr; prereq VPB 3103)
Current techniques used in the laboratory diagnosis of infectious disease; isolation and identification of bacteria and yeasts; antimicrobial susceptibility testing. Lecture and lab.

MedT 5127. Introduction to Management and Education. (1 cr)
Basic concepts in management and education.

MedT 5310. Clinical Chemistry I. (2 cr)
Renal structure and function and the analysis of urine and body fluids. Renal role in homeostasis and chemical methods to evaluate renal function. Quality assurance, quality control, reference ranges, method evaluation. Lecture.

MedT 5311. Clinical Chemistry I—Laboratory Applications. (2 cr)
Basic lab techniques for analyzing urine and body fluids (physical, chemical, microscopic). Lab skills developed include performing renal function tests (e.g., creatinine, urea) and using instrumentation (e.g., spectrophotometers).

MedT 5320. Clinical Chemistry II. (2 cr)
Electrolytes, acid-base balance, endocrinology, proteins, and carbohydrates. Emphasis on measurement methods and physiological relevance. Lecture.

MedT 5321. Clinical Chemistry II—Laboratory Applications. (2 cr)
Analyzing electrolytes, osmolality, blood gases, hormones, and proteins. Development of lab skills and instrumentation use with emphasis on quality control and technique. Methods include nephelometry, electrophoresis, immunoassays, and colorimetric techniques.

MedT 5330. Clinical Chemistry III. (2 cr)
Lipids, therapeutic drug monitoring, toxicology, enzymes, liver, and digestive tract. Emphasis on measurement methods and physiological relevance. Lecture.

MedT 5331. Clinical Chemistry III—Laboratory Applications. (2 cr)
Analyzing lipids, drugs, enzymes, liver, and digestive function tests. Techniques include electrophoresis; affinity, thin-layer, and gas chromatography; immunoassays; and spectrophotometric techniques.

MedT 5765. Hematology Morphology. (4 cr)
Morphology, development, and function of hematopoietic cells, with emphasis on examining peripheral blood and bone marrow. Correlation of hematology morphologic findings with specific physiologic or pathologic processes.

Required Courses Offered by Other Units

CBN 3001/3003. Elementary Anatomy. (5 cr; prereq regis paramed fields, 1 qtr college biology)
A general survey of human anatomy including histology, embryology, gross anatomy, and neuroanatomy, with some clinical and physiological correlations.

Biol 1009. General Biology. (5 cr)
Introduction to the principles of biology. The cell, metabolism, heredity, reproduction, ecology, and evolution.

Biol 5003. Genetics. (4 cr, §GCB 3022, §GCB 5022; prereq 5001 or BioC 3021 or BioC 5331)
Introduction to the nature of genetic information and its transmission from parents to offspring, expression in cells and organisms, and course in populations.

Chem 1051-1052. Chemical Principles I-II. (4 cr per qtr; primarily for science or engineering majors; prereq 1001 or passing placement examination; 3 lect, 1 lab discussion, one 3-hr lab per wk)
Atomic theory; periodic properties of elements; chemical thermodynamics; development of structural concepts; geometry of molecules; bonding theory; behavior of gaseous and liquid states; solid state and materials; chemistry; dynamics: equilibrium; behavior of solutions; acids and bases; descriptive chemistry of elements and compounds.

Chem 3301-3302. Elementary Organic Chemistry I-II. (4 cr per qtr; prereq 1052 or equiv)
Important classes of organic compounds, their constitution, configurations, and conformations; relationship between molecular structure and chemical reactivity. Reactions of organic compounds, nucleophilic substitution and addition; electrophilic substitution and addition; elimination reactions; molecular arrangements; oxidation and reduction.

Chem 3305. Elementary Organic Chemistry Laboratory I. (2 cr; prereq 3301 or §3301)
Lab techniques used in preparing, purifying, and characterizing typical organic substances.

Chem 3306. Elementary Organic Chemistry Laboratory II. (2 cr; prereq 3302 or §3302)
Continuation of Chem 3305.

LaMP 5177. Pathology for Allied Health Students. (4 cr)
General and systems pathology. Strongly recommended.
Math 1031. College Algebra and Probability. (4 cr, §1051, §1111, §1151, §1201; prereq 3 yrs high school math, placement exam or GC 0631 with a grade of C or better)
Algebra and analytic geometry explored in greater depth than is usually done in three years of high school mathematics. Additional topics from combinations, permutations, and probability. A suitable prerequisite for 1131 or 1142, but not for 1251.

Math 1051. Precalculus I. (4 cr, §1008, §1031, §1111, §1151, §1201; prereq 3 yrs high school mathematics, placement exam or GC 0631 with a grade of C or better)
Algebra, analytic geometry, and trigonometry beyond the usual coverage found in a three-year high school mathematics program. First of two courses (see 1151). Prepares students for the full calculus sequence. Not an acceptable prerequisite for 1131.

Math 1251-1252. One-Variable Differential and Integral Calculus I-II. (4 cr each, §1211-1221, §1411H-1421H, §1451H-1452H; prereq 4 yrs high school mathematics including trigonometry or grade of C or better in 1151 or equiv; grade of C or better in 1251 required for 1252)
Calculus of functions of one-variable and related geometry and applications.

MdBc 5300. Biochemistry. (4 cr; prereq organic chemistry, physics)
Biochemical principles. Includes proteins, enzymes, biological energy metabolism, glycolysis, citric acid cycle, pentose phosphate pathway, gluconeogenesis, glycogen metabolism, fatty acid metabolism, amino acid metabolism, biological membranes. DNA, RNA, the genetic code, control of gene expression.

MdBc 5301. Biochemistry. (3 cr; prereq BioC 3021 or MdBc 5300)
Biochemical principles. Includes protein synthesis, body fluids, hemoglobin, respiration, kidney function, acid base balance, endocrinology, nutrition, and vitamins.

Phs1 3051. Human Physiology. (5 cr)
The study of normal function (processes) in humans.

Phys 1041-1042. Introductory Physics. (5 cr per qtr; prereq high school algebra and plane geometry; 4 lect, 1 rec, 2 lab hrs per wk)
Lectures, recitation, and lab sessions. Primarily for students interested in topics useful in technical areas. Fundamental principles of physics in context of the everyday world. Use of kinematics, dynamics, and conservation principles with quantitative and qualitative problem-solving techniques to understand phenomena of mechanics, electromagnetism, and the structure of matter.

Stat 3011. Statistical Analysis. (4 cr per qtr; prereq college algebra)
Descriptive statistics; elementary probability; estimation; one- and two-sample tests; correlation; introduction to regression; ANOVA; randomized blocks; multiple comparisons; factorial experiments; multiple regression; goodness of fit; nonparametric methods; contingency tables; selected topics.

VPB 3103. General Microbiology. (5 cr)
Basic techniques in microbiology, including microscopy, culture techniques, and microbial structure and growth; application of microbiological techniques to a wide variety of disciplines, including food microbiology, environmental microbiology, and infectious disease. Lecture and lab.

Graduate Courses in Medical Technology (MedT) or Clinical Laboratory Science (CLS)
CLS 5120. Seminar: Medical Technology. (1-3 cr)
CLS 5125. Practicum: Teaching. (max 3 cr)
CLS 5128. Elements of Laboratory Administration. (3 cr)
CLS 5130. Practicum in Laboratory Administration. (3 cr)
CLS 5133. Medical Mycology. (4 cr)
CLS 5135. Advanced Clinical Microbiology. (5 cr)
CLS 5140. Techniques for Teaching. (3 cr)
CLS 5145. Development of Medical Technology. (3 cr)
CLS 5155. Advanced Clinical Hematology. (5 cr)
CLS 5165. Advanced Clinical Immunohematology. (5 cr)
CLS 5173. Analytic Techniques in Laboratory Medicine.

CLS 5175. Advanced Clinical Chemistry. (5 cr)
CLS 5179. Chemistry Seminar. (1 cr)
CLS 8176. Advanced Topics in Clinical Chemistry. (Cr ar)

CLS 8230. Advanced Medical Bacteriology. (Cr ar)