# 2010-2011 Course Catalog

The University Of Montana

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## Medical Technology

**Michael Minnick (Professor of Microbiology), Advisor**

Medical Technology or clinical laboratory sciences, is a combined study of chemistry, physiology and microbiology. A medical technologist performs chemical, microscopic, and microbiological procedures used in the diagnosis, study and treatment of disease, under the supervision of a qualified physician or lab director. Medical technologists are in high demand in hospital labs, clinical labs, research institutions and government health departments. Although certification is required for clinical practice, individuals with a B.S. degree in Medical Technology are qualified microbiologists and can obtain positions in research many labs as technicians. The degree is also an excellent foundation for students planning to attend professional schools in the health sciences or graduate school in the molecular biosciences.

Four years are required to earn a B. S. degree in Medical Technology. The curriculum is devoted to development of a sound foundation in chemistry, biology, and microbiology and clinical methods. The student is encouraged to obtain an understanding of social science and cultural subjects.

To be certified by the Board of Registry, a student, after satisfying the minimum course requirements, serves a clinical internship of at least 12 consecutive months in an approved school of medical technology endorsed by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS) or American Society of Clinical Pathology (ASCP) of the American Medical Association. After completing a clinical internship and passing the Registry exam, the student receives a diploma from the Board of Registry with the professional designation of Medical Technologist M.T. ASCP).

The University of Montana has two coursework options for the medical technology degree:

Option A is a 4+1 curriculum in which the student completes the B.S. degree and subsequently does a one-year clinical internship if desired. Students who choose the 4+1 curriculum do a clinical internship by applying in the fall of their senior year. Details and application forms can be obtained online at the following: http://www.umt.edu/Medtech/. Internship applications are typically due in October for enrollment the following May.

Option B is a 3+1 curriculum designed to fast-track students who definitely want to become a medical technologists. The first three years are completed at UM. The fourth year is applied and incorporates both classroom learning and a clinical internship at one of our affiliates (University of North Dakota or at the Montana Medical Laboratory Science Training Program) in cooperation with several clinical sites located in Montana and the Midwest. Internship information is available online at http://www.umt.edu/medtech/. The B.S. degree and certification are granted after successful completion of the fourth year.

High School Preparation: In addition to the general University requirements for admission, it is recommended that high school preparation include algebra, geometry, trigonometry, chemistry, and a foreign language.

## Special Degree Requirements

Refer to graduation requirements listed previously in the catalog. See index.

In addition to the General Education requirements, the following courses are required for either option leading to a Bachelor of Science in Medical Technology: Thirty or more credits (300-level or above) in biology, biochemistry and microbiology including BIOM 360-361 (MICB 300-301), BIOH 405 (MICB 309), BIOB 410 (MICB 410), BIOM 402-403 (MICB 412-413), BIOM 435 (MICB 420), BCH 380 (BIOC 380); BIOB 260, 275 (BIOL 221, 223), BIOL 312, BIOM 427-428 (BIOL 400-401); CHMY 141N,143N (CHEM 161N-162N), 221-223 and M 162 or 171 (MATH 150) and STAT 216 (MATH 241). The 4+1 option also requires CHMY 222-224, 311 (CHEM 222-224,341); BIOH 405 (MICB 309), BIOM 407-408 (MICB 406-407); and BIBO 411 (MICB 411); and PHSX 205N/206N, 207N/208N (PHYS 111N/113N, 112N/114N) . The 3+1 option also requires 37 credits of BIOM 498 (MICB 490) (Med Tech Internship).

Upper-Division Writing Expectation: To meet the Upper-Division Writing Expectation for the major, medical technology 4+1 students take BIOB 410 (MICB 410) and BIOB 411 (MICB 411); 3+1 students take BIOB 410 (MICB 410), BIOM 402 (MICB 412), and one class chosen from: BCH 482 (BIOC 482), BIOB 411 (MICB 411), or BIOM 499 (MICB 499).

## Suggested Course of Study

### Option A (4+1)

| First Year | A | S |
|---|---|---|
| CHMY 141N,143N (CHEM 161N-162N) College Chemistry and Laboratory | 5 | 5 |
| +M 162 (MATH 150) Applied Calculus | 4 | - |
| +WRIT 101 (ENEX 101) College Writing I | 3 | - |
| General Education | 3 | 9 |
| Electives | - | 1 |
| Total | 15 | 15 |
| +Depends on placement exam | | |
| **Second Year** | **A** | **S** |
| BIOB 260 (BIOL 221) Cellular and Molecular Biology | 4 | - |

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|---|---|---|---|---|
| BIOB 275 (BIOL 223) General Genetics | - | | 4 | |
| CHMY 221-222, 223-224 (CHEM 221-222, 223-224) Organic Chemistry and Laboratory | 5 | | 5 | |
| BIOM 360-361 (MICB 300-301) General Microbiology and Laboratory | - | | 5 | |
| Lower-Division Writing Course | 3 | | - | |
| General Education | 3 | | - | |
| Elective | - | | 1 | |
| Total | 15 | | 15 | |
| Third Year | | A | | S |
| BIOL 312 Anatomy and Physiology I | 4 | | - | |
| BIOC 380 Biochemistry | 4 | | - | |
| BIOB 410-411 (MICB 410-411) Immunology and Laboratory* | 5 | | - | |
| BIOM 402-403 (MICB 412-413) Medical Bacteriology and Mycology and Laboratory | - | | 5 | |
| STAT 216 Intro to Statistics | - | | 4 | |
| General Education | - | | 3 | |
| Electives | 3 | | 2 | |
| Total | 16 | | 14 | |
| Fourth Year | | A | | S |
| CHMY 311 (CHEM 341) Quantitative Analysis and Instrumental Methods | 4 | | - | |
| BIOM 427-428 (BIOL 400-401) General Parasitology and Lab | 4 | | - | |
| BIOH 405 (MICB 309) Hematology | 3 | | - | |
| BIOM 407-408 (MICB 406-407) Clinical Diagnosis and Laboratory | - | | 3 | |
| BIOM 435 (MICB 420) Virology | - | | 3 | |

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|---|---|---|
| PHSX 205N-206N, 207N-208N (PHYS 111N-113N, 112N-114N) Fundamentals of Physics I, II and Lab | 5 | 5 |
| Elective | - | 3 |
| Total | 16 | 14 |

## Suggested Course of Study

### Option B (3+1)

| First Year | A | S |
|---|---|---|
| CHMY 141N-143N (CHEM 161N-162N) College Chemistry and Laboratory | 5 | 5 |
| +WRIT 101 (ENEX 101) College Writing I | 3 | - |
| +M 162 (MATH 150) Applied Calculus | 4 | - |
| General Education | 3 | 9 |
| Electives | 1 | 1 |
| Total | 16 | 15 |
| +Depends on placement exam | | |
| **Second Year** | **A** | **S** |
| BIOB 260 (BIOL 221) Cellular and Molecular Biology | 4 | - |
| BIOB 275 (BIOL 223) General Genetics | - | 4 |
| BIOL 312 Anatomy and Physiology | 4 | - |
| CHMY 221-222, (CHEM 221-222) Organic Chemistry and Laboratory | 5 | - |
| BIOM 360-361 (MICB 300-301) General Microbiology and Laboratory | - | 5 |
| Lower-Division Writing Course | - | 3 |
| General Education | - | 3 |
| Elective | 3 | - |
| Total | 16 | 15 |

| Third Year | A | S |
|---|---|---|
| BHC 380 (BIOC 380) (or two upper-division Biology or Microbiology*) Biochemistry | 4 | - |
| BIOM 427-428 (BIOL 400-401) General Parasitology and Lab | 4 | - |
| BIOH 405 (MICB 309) Hematology | 3 | - |
| BIOB 410-411 (MICB 410-411) Immunology and Laboratory | 5 | - |
| BIOM 402-403 (MICB 412-413) Medical Bacteriolgy & Mycology and Laboratory | - | 5 |
| BIOM 435 (MICB 420) Virology | - | 3 |
| STAT 216 Introduction to Statistics | - | 4 |
| General Education | - | 3 |
| Total | 16 | 15 |

**Courses**

U=for undergraduate credit only, UG=for undergraduate or graduate credit, G=for graduate credit. R after the credit indicates the course may be repeated for credit to the maximum indicated after the R.

**Clinical Laboratory Science (CLS)**

U 460 Clinical Immunohematology I 1 cr. Offered summer. Prereq., consent of medical technology advisor. Practical application of modern transfusion techniques, component therapy, and quality assurance.

U 461 Clinical Chemistry Theory 2 cr. Offered summer. Prereq., consent of medical technology advisor. Overview of clinical chemistry theory, principles, procedures, and correlations. Topics include instrumentation, carbohydrates, proteins, lipids, enzymes, liver function, blood gases, electrolytes, renal function, endocrinology, therapeutic drug monitoring and toxicity.

U 462 Clinical Laboratory I 1 cr. Offered summer. Prereq., consent of medical technology advisor. Theory and practice of phlebotomy in the clinical setting, specimen processing, review of state and federal regulations, safety and biohazard compliance, interpersonal relationship skills.

U 463 Clinical Hemostasis 2 cr. Offered summer. Prereq., consent of medical technology advisor. Physiological mechanisms of normal human hemostasis as well as hereditary and acquired bleeding and thrombotic defects are discussed. Laboratory

techniques for obtaining blood, screening procedures, specific assays and procedures to monitor anticoagulant therapy.

U 464 Clinical Microscopy and Urinalysis 2 cr. Offered summer. Prereq., consent of medical technology advisor. Theory, techniques and practice of routine urinalysis.

U 465 Clinical Body Fluids 1 cr. Offered summer. Prereq., consent of medical technology advisor. Body fluid physiology, pathology, laboratory measurement and case study analysis. Focus on laboratory technologies, principles of operation of various laboratory instruments and quality management in the clinical setting.

U 467 Clinical Immunohematology Theory 1 cr. Offered summer. Prereq., consent of medical technology advisor. Theory of modern transfusion techniques, component therapy, and quality assurance.

U 468 Clinical Microbiology Theory and Laboratory 2 cr. Offered summer. Prereq., consent of medical technology advisor. Study of groups of medically important bacteria correlated to laboratory practice in identification. Includes antibiotic susceptibility testing, quality control, and methods of identification; rapid, automated and traditional methods.

U 470 Clinical Immunohematology II 2 cr. Offered autumn. Prereq., consent of medical technology advisor. Techniques and modern transfusion practices at the clinical affiliate. Review of the basic and advanced information in blood banking with correlation between laboratory testing and patient care.

U 471 Clinical Chemistry I 3 cr. Offered autumn. Prereq., consent of medical technology advisor. Applied theory and practice in clinical chemistry at the clinical affiliate. Review of the basic and advanced information in clinical chemistry with correlation between laboratory testing and patient care.

U 472 Clinical Hematology I 2 cr. Offered autumn. Prereq., consent of medical technology advisor. Morphologic evaluation of blood smears, interpretive correlation of hematology finds and the pathophysiology of disorders of the hematopoietic system.

U 473 Clinical Laboratory II 1 cr. Offered autumn. Prereq., consent of medical technology advisor. Focus on performing phlebotomy techniques, hemostasis procedures and laboratory safety. Communication skills, attitude and work performance will be evaluated.

U 474 Clinical Microbiology I 2 cr. Offered autumn. Prereq., consent of medical technology advisor. Techniques and practices in clinical microbiology at the clinical affiliate. Psychomotor skills, performance and understanding of the procedure methodologies, along with the relationship of test results to the patient disease/care.

U 475 Clinical Laboratory III 1 cr. Offered autumn. Prereq., consent of medical technology advisor. Observation, practice or research in specialized areas or settings at the clinical affiliate.

U 476 Clinical Immunology 1 cr. Offered autumn. Prereq., consent of medical technology advisor. Applied theory and practice in clinical immunology and serology at the clinical affiliate.

U 477 Medical Mycology 1 cr. Offered autumn. Prereq., consent of medical technology advisor. Comparative morphology, physiology and pathogenicity of medically important fungi. Laboratory methods for identification emphasize interpretation and evaluation of results including the recognition of contaminating organisms.

U 480 Financial and Quality Management of the Clinical Laboratory 3 cr. Offered spring. Prereq., consent of medical technology advisor. A capstone course designed to provide senior CLS students with the skills to manage a clinical laboratory. Brings together previous content with a focus on laboratory profitability, quality management and quality improvement.

U 481 Clinical Chemistry II 2 cr. Offered spring. Prereq., consent of medical technology advisor.

U 482 Clinical Immunohematology III 2 cr. Offered spring. Prereq., consent of medical technology advisor. Techniques and modern transfusion practices at the clinical affiliate. Psychomotor skills, performance and understanding of the procedure methodologies, along with the relationship of test results to the patient disease/care.

U 483 Clinical Hematology II 3 cr. Offered spring. Prereq., consent of medical technology advisor. Techniques and practices in clinical hematology at the clinical affiliate. Psychomotor skills, performance and understanding of the procedure methodologies, along with the relationship of test results to the patient disease/care.

U 485 Clinical Microbiology II 2 cr. Offered spring. Prereq., consent of medical technology advisor. Techniques and practices in clinical microbiology at the clinical affiliate. Psychomotor skills, performance and understanding of the procedure methodologies, along with the relationship of test results to the patient disease/care.