Michigan Technological University

MLS Student Handbook

2017 Edition
MTU Medical Lab Science Program

Part I: Program Overview

Mission Statement:

We equip students with the knowledge, skills, and integrity needed to successfully enter the profession of Medical Laboratory Science and other health-related professional programs.

Program Learning Goals:

Goal 1: Apply major concepts of human biology pertinent to MLS.

Goal 2: Perform laboratory skills used by clinical scientists working in a diagnostic laboratory.

Goal 3: Categorize laboratory testing and problem-solving as pre-analytical, analytical, and post-analytical.

Goal 4: Process and communicate pertinent clinical information.

Goal 5: Comprehend MLS professional issues.

Graduate Competencies:

- Demonstrate appropriate specimen collection, processing, analysis, and reporting of results in a timely manner with accuracy and precision
- Apply safety and governmental regulations throughout the pre-analytical, analytical, and post-analytical phases of clinical laboratory testing.
- Utilize the principles and practices of professional and ethical conduct while demonstrating appropriate communication skills to sufficiently meet the needs to educate patients and other healthcare professionals
- Demonstrate professional development through continuing education in the field of Medical Laboratory Science
- Put into practice administrative and supervisory skills as are relevant to the healthcare system and Medical Laboratory Science field
- Employ the use of critical thinking and problem-solving skills to identify and evaluate:
  - Calibration, maintenance, quality assurance, and any necessary corrective actions
  - Appropriate confirmatory testing and reporting of abnormal patient results
- Assist with the implementation of test systems including correlational studies, reference ranges, statistical analysis, etc., to allow confident dissemination of accurate testing results

**Career Entry Level Description:**

At the point of career entry, the Medical Laboratory Scientist, also known as Clinical Laboratory Scientist or Medical Technologist, will have proficiency in the medical laboratory testing areas of Hematology, Chemistry, Microbiology, Immunology, and Immunohematology (blood banking). They will also have experience in newly emerging diagnostics such as Molecular Testing. This is acquired upon completion of the academic requirements at Michigan Technological University and successful completion of a Clinical Practicum.

**MLS Program Accreditation:**

The Medical Laboratory Science (MLS) 4+1 program has successfully submitted the Preliminary Report and Self Study. Once the Self Study is approved, we will have achieved “serious applicant” status with the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS, 5600 N. River Road, Suite 720, Rosemont, IL 60018, 773-714-8880, www.nacls.org). The “serious applicant” status allows students that are eligible to take MLS Board of Certification Examination (questions regarding eligibility for such examinations should be directed to ASCP Board of Certification, 800-267-2727; info@ascp.org).

**MLS Program Faculty & Staff:**

**MLS Program Director:**
Karyn Fay, MS, MT (ASCP) SH
Dow 734
kafay@mtu.edu
Office: 906-487-2254

**MLS Clinical Practicum Coordinator:**
Kelsey Johnson, MBA, MLS(ASCP) CM
Dow 528
kelseyj@mtu.edu
Office: 906-487-2120
Cell: 906-370-4860

**MLS/Biological Sciences Lecturer:**
Brigitte Morin, MS
Dow 736
bemorin@mtu.edu
Office: 906-487-3373
**Program Director:**

The program director is responsible for the day-to-day operations of the academic program. Duties include, but are not limited to, advising students throughout the MLS program, monitoring curricular requirements in accordance with NAACLS, maintaining outcome data for the academic and clinical programs, monitoring budgetary matters, and managing continuous improvement of the MLS program.

**Clinical Practicum Coordinator:**

The clinical practicum coordinator will be the primary university contact person for practicum students and will be responsible for organizing student practicums, maintaining NAACLS accreditation, teaching the online practicum course, monitoring student progress, and maintaining ongoing communication with affiliates and practicum students.

**MLS Program Degree Concentrations:**

There are five specialty concentrations available with the Bachelor of Science in Medical Laboratory Science.

1. **Medical Lab Science 3+1**
   a. Students who choose the 3+1 major are on the fast track to becoming a Medical Lab Scientist. Students spend three years on campus learning fundamental information in preparation for a fourth-year clinical practicum at a NAACLS-accredited teaching hospital that is affiliated with Michigan Tech. The practicum experience will consist of academic studies combined with hands-on experience in the clinical laboratory.

   After successful completion of coursework, hospital training, and the receipt of their BS in MLS, students will be qualified to take an examination for national certification as a Medical Laboratory Scientist.

2. **Medical Lab Science 4+1**
   a. Students who choose the 4+1 option are on a similar track as 3+1 students, but with an extra year on campus for study and specialization. Students spend the first three years on campus taking fundamental course work, with an additional year on campus for specialty course work.
Following the completion of your coursework and receipt of their BS in MLS, students have two options for completing a clinical practicum:

i. University-based route: Under this route, MTU holds the accreditation and students are able to complete their fifth-year practicum at any one of our non-NAACLS accredited affiliate hospitals. Practicum students will enroll in BL4612 for coursework while receiving hands-on experience in the clinical lab.

After successful completion of the clinical practicum, students will be qualified to take an examination for national certification as a Medical Laboratory Scientist, following approval from the MTU Program Director.

ii. Hospital-based route: Under this route, students complete their fifth-year practicum at any NAACLS-accredited hospital. Students may choose to apply to the Michigan Match program, Wisconsin affiliates, Minnesota affiliates, Ohio affiliates, or seek out their own opportunities elsewhere. All coursework and clinical experience is at the discretion of the clinical practicum site under this route.

After successful completion of the clinical practicum, students will be qualified to take an examination for national certification as a Medical Laboratory Scientist, following approval from the hospital Program Director.

3. Medical Lab Science 4+1 Cytotechnology
   a. The Medical Laboratory Science 4+1 Cytotechnology concentration is similar to the Medical Laboratory Science 3+1 option, but with an added year for additional study and specialization. Students will spend four years on campus—taking three years of fundamental course work plus an additional year of specialty course work—in preparation for a fifth-year clinical practicum, completed at a teaching hospital with an accredited Cytotechnology program. The practicum consists of academic studies combined with extensive hands-on experience in microscopy, diagnosis of malignancies, and other cell abnormalities.
After earning a BS in MLS and successful completion of hospital training, students will be qualified to take an examination for national certification as a Cytotechnologist.

4. Medical Lab Science 4+1 Histotechnology
   a. Students who want to use their degree to become a histologic technician or histotechnologist will pursue the Medical Laboratory Science 4+1 Histotechnology concentration option. Students will spend four years on campus taking fundamental course work, and then have the option to complete a fifth-year histotechnology clinical practicum at an accredited teaching hospital. The practicum is encouraged but not required, and consists of academic studies combined with extensive hands-on experience focusing on tissue preparation.

   After successful completion of University course work and training in a medical histology laboratory (for those who choose to complete a practicum), students will receive a BS in Medical Laboratory Science and be qualified to take an examination for national certification as a Histotechnologist.

5. Medical Lab Science 4+1 Secondary Education Teacher Certificate
   a. Students interested in teaching at the high school level will pursue a degree in Medical Laboratory Science with a 4+1 Secondary Education concentration. They will build a framework of Medical Laboratory Science knowledge and education course work, including directed (student) teaching, that will qualify them to teach high school courses such as biology or chemistry. After successful completion of University course work, students will receive both a BS in Medical Laboratory Science and a secondary school teacher certification.

   Additionally, students may complete a clinical practicum through the university-based or hospital-based route to become qualified to take an examination for national certification as a Medical Laboratory Scientist.
Program Major Requirements:

The following is an overview of the major requirements for the 3+1 and 4+1 degree options:

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Title</th>
<th>Credits</th>
<th>Semester Offered</th>
<th>Prereq</th>
</tr>
</thead>
<tbody>
<tr>
<td>BL 0800</td>
<td>Practicum and Career Prep</td>
<td>1*</td>
<td>Spring</td>
<td>BL 1010</td>
</tr>
<tr>
<td>BL 1020</td>
<td>General Biology II</td>
<td>4</td>
<td>Spring, Summer</td>
<td>BL 1010 (or BL 1020)</td>
</tr>
<tr>
<td>BL 1080</td>
<td>Intro to Medical Lab Science</td>
<td>1</td>
<td>Fall</td>
<td>BL 1000 and BL 1200</td>
</tr>
<tr>
<td>BL 1710</td>
<td>Medical Terminology</td>
<td>1</td>
<td>Fall</td>
<td>BL 1000 (or BL 1020)</td>
</tr>
<tr>
<td>BL 2100</td>
<td>Anatomy &amp; Physiology I</td>
<td>3</td>
<td>Fall</td>
<td>BL 1000 (or BL 1020)</td>
</tr>
<tr>
<td>BL 2110</td>
<td>Anatomy &amp; Physiology II</td>
<td>3</td>
<td>Spring</td>
<td>BL 1000 (or BL 1020)</td>
</tr>
<tr>
<td>BL 2120</td>
<td>Principles of Biochemistry</td>
<td>3</td>
<td>Fall</td>
<td>BL 1000 (or BL 1020)</td>
</tr>
<tr>
<td>BL 2200</td>
<td>Genetics</td>
<td>3</td>
<td>Spring, Summer</td>
<td>BL 1000 (or BL 1020)</td>
</tr>
<tr>
<td>BL 2410</td>
<td>Basic Medical Lab Techniques</td>
<td>3</td>
<td>Fall</td>
<td>BL 1000 (or BL 1020)</td>
</tr>
<tr>
<td>BL 3210</td>
<td>General Microbiology</td>
<td>4</td>
<td>Fall</td>
<td>BL 1000 (or BL 1020)</td>
</tr>
<tr>
<td>BL 3230</td>
<td>Medical Microbiology</td>
<td>4</td>
<td>Spring</td>
<td>BL 1000 (or BL 1020)</td>
</tr>
<tr>
<td>BL 3640</td>
<td>General Immunology</td>
<td>3</td>
<td>Fall, Summer</td>
<td>BL 1000 (or BL 1020)</td>
</tr>
<tr>
<td>BL 3780</td>
<td>Medical Parasitology Lab</td>
<td>1</td>
<td>Spring</td>
<td>BL 1000 (or BL 1020)</td>
</tr>
<tr>
<td>BL 4030</td>
<td>Molecular Biology</td>
<td>3</td>
<td>Fall, Summer</td>
<td>BL 1000 (or BL 1020)</td>
</tr>
<tr>
<td>BL 4550</td>
<td>Clinical Chemistry</td>
<td>3</td>
<td>Spring</td>
<td>BL 1000 (or BL 1020)</td>
</tr>
<tr>
<td>BL 4640</td>
<td>Clinical Immunology &amp; Serology</td>
<td>2</td>
<td>Fall</td>
<td>BL 1000 (or BL 1020)</td>
</tr>
<tr>
<td>BL 4720</td>
<td>Hematology and Hemostasis</td>
<td>3</td>
<td>Fall</td>
<td>BL 1000 (or BL 1020)</td>
</tr>
<tr>
<td>BL 4730</td>
<td>Immunohematology Techniques</td>
<td>1</td>
<td>Fall</td>
<td>BL 1000 (or BL 1020)</td>
</tr>
<tr>
<td>BL 4750</td>
<td>Medical Lab Instrumentation</td>
<td>2</td>
<td>Spring</td>
<td>BL 1000 (or BL 1020)</td>
</tr>
<tr>
<td>BL 4980</td>
<td>SML Core Concept Integration</td>
<td>2</td>
<td>Spring</td>
<td>BL 1000 (or BL 1020)</td>
</tr>
<tr>
<td>MA 2720</td>
<td>Statistical Methods</td>
<td>4</td>
<td>Fall, Summer</td>
<td>BL 1000 (or BL 1020)</td>
</tr>
</tbody>
</table>
## Medical Laboratory Science 4+1

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Title</th>
<th>Credits</th>
<th>Semester Offered</th>
<th>Prereq</th>
</tr>
</thead>
<tbody>
<tr>
<td>BL 0000</td>
<td>Practicum and Career Prep</td>
<td>1*</td>
<td>Spring</td>
<td></td>
</tr>
<tr>
<td>BL 1020</td>
<td>General Biology II</td>
<td>4</td>
<td>Spring, Summer</td>
<td>BL 1010</td>
</tr>
<tr>
<td>BL 1600</td>
<td>Intro to Medical Lab Science</td>
<td>1</td>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>BL 1710</td>
<td>Medical Terminology</td>
<td>1</td>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>BL 2010</td>
<td>Anatomy &amp; Physiology I</td>
<td>3</td>
<td>Fall, Summer</td>
<td>CH 1000 or (CH 1150 and CH 1151)</td>
</tr>
<tr>
<td>BL 2011</td>
<td>Anatomy &amp; Physiology I Lab</td>
<td>1</td>
<td>Fall, Summer</td>
<td>BL 2010(C)</td>
</tr>
<tr>
<td>BL 2020</td>
<td>Anatomy &amp; Physiology II</td>
<td>3</td>
<td>Spring</td>
<td>BL 2010</td>
</tr>
<tr>
<td>BL 2021</td>
<td>Anatomy &amp; Physiology II Lab</td>
<td>1</td>
<td>Spring</td>
<td>BL 2011 and BL 2200(C)</td>
</tr>
<tr>
<td>BL 2100</td>
<td>Principles of Biochemistry</td>
<td>3</td>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>BL 2200</td>
<td>Genetics</td>
<td>3</td>
<td>Spring, Summer</td>
<td></td>
</tr>
<tr>
<td>BL 2410</td>
<td>Basic Medical Lab Techniques</td>
<td>3</td>
<td>Fall</td>
<td>BL 1020 or BL 1040</td>
</tr>
<tr>
<td>BL 3210</td>
<td>General Microbiology</td>
<td>4</td>
<td>Fall</td>
<td>BL 1020 or BL 1040 and (BL 2100 or CH 4710)</td>
</tr>
<tr>
<td>BL 3320</td>
<td>Medical Bacteriology</td>
<td>4</td>
<td>Spring</td>
<td>BL 3210</td>
</tr>
<tr>
<td>BL 3640</td>
<td>General Immunology</td>
<td>3</td>
<td>Fall, Summer</td>
<td>BL 1020 or BL 1040 or BL 2200 or BE 2400</td>
</tr>
<tr>
<td>BL 3780</td>
<td>Medical Parasitology Lab</td>
<td>1</td>
<td>Spring</td>
<td>BL 1710 and BL 2410</td>
</tr>
<tr>
<td>BL 4030</td>
<td>Molecular Biology</td>
<td>3</td>
<td>Fall, Summer</td>
<td>BL 1020 or BL 1040 and (BL 2100 or CH 4710)</td>
</tr>
<tr>
<td>BL 4550</td>
<td>Clinical Chemistry</td>
<td>3</td>
<td>Spring</td>
<td>BL 2020 and BL 3640</td>
</tr>
<tr>
<td>BL 4840</td>
<td>Clinical Immunology &amp; Serology</td>
<td>2</td>
<td>Fall</td>
<td>BL 2410 and BL 3640</td>
</tr>
<tr>
<td>BL 4720</td>
<td>Hematology and Hemostasis</td>
<td>3</td>
<td>Fall</td>
<td>BL 4730(C)</td>
</tr>
<tr>
<td>BL 4730</td>
<td>Immunohematology Techniques</td>
<td>1</td>
<td>Fall</td>
<td>BL 4720(C)</td>
</tr>
<tr>
<td>BL 4750</td>
<td>Medical Lab Instrumentation</td>
<td>2</td>
<td>Spring</td>
<td></td>
</tr>
<tr>
<td>BL 4980</td>
<td>SML Core Concept Integration</td>
<td>2</td>
<td>Spring</td>
<td>BL 3230(C) and BL 4550(C) and BL 4640 and BL 4720 and BL 4730</td>
</tr>
<tr>
<td>CH 1150</td>
<td>University Chemistry I</td>
<td>3</td>
<td>Fall, Spring, Summer</td>
<td>MA 1031(C) or MA 1032(C) or MA 1160(C) or MA 1161(C) or MA 1162(C) or Math Placement</td>
</tr>
<tr>
<td>CH1151</td>
<td>University Chemistry Lab I</td>
<td>1</td>
<td>Fall, Spring, Summer</td>
<td>MA 1031(C) or MA 1032(C) or MA 1160(C) or MA 1161(C) or MA 1162(C) or Math Placement</td>
</tr>
<tr>
<td>CH1153</td>
<td>University Chem Recitation I</td>
<td>1</td>
<td>Fall, Spring, Summer</td>
<td>MA 1031(C) or MA 1032(C) or MA 1160(C) or MA 1161(C) or MA 1162(C) or Math Placement</td>
</tr>
<tr>
<td>CH1160</td>
<td>University Chemistry II</td>
<td>3</td>
<td>Fall, Spring, Summer</td>
<td>CH 1112 or (CH 1150 and CH 1151) and CH 1161(C)</td>
</tr>
<tr>
<td>CH1161</td>
<td>University Chem Lab II</td>
<td>1</td>
<td>Fall, Spring, Summer</td>
<td>CH 1112 or (CH 1150 and CH 1151) and CH 1161(C)</td>
</tr>
<tr>
<td>CH1162</td>
<td>University Chem Recitation II</td>
<td>1</td>
<td>Fall, Spring, Summer</td>
<td>CH 1150 and CH 1151 and CH 1161(C)</td>
</tr>
<tr>
<td>CH 2410</td>
<td>Organic Chemistry I</td>
<td>3</td>
<td>Fall, Spring, Summer</td>
<td>CH 1122 or (CH 1160 and CH 1161)</td>
</tr>
<tr>
<td>MA 2720</td>
<td>Statistical Methods</td>
<td>4</td>
<td>Fall, Spring, Summer</td>
<td>MA 1020 or MA 1630 or ALEKS Math Placement + 40</td>
</tr>
</tbody>
</table>

---

8
Part II: General Policies

Program Admission:

Admission to the Medical Lab Science Program is made on a rolling basis. Students may enter the program at the start of the Fall or Spring semester, or may transfer in laterally from other programs. GPA and ACT criteria for program admission comply with Michigan Tech standards. Students should have a GPA >3.0 and ACT score greater than or equal to 22. Students who do not meet the criteria will be evaluated on a case-by-case basis.

Tuition, Fees, & Refund Policy:

Please see Student Finance Policies (http://www.mtu.edu/catalog/policies/finance/)

Student Grievance & Appeals:

Please see the Dean of Students website. (http://www.mtu.edu/deanofstudents/academic-policies/grievance/)

Attendance:

Attendance policies will be outlined clearly in each course syllabus. Students are expected to attend all classes and labs regularly. In the event that the student is unable to attend class or lab, they must email the instructor prior to the start of class.

Program Progression:

Essential Functions/ Technical Performance Standards:

Essential Functions/Technical Performance Standards represent the non-academic requirements of the program. Students must be able to meet and master program essential functions, or request reasonable accommodations to successfully complete these essential functions, in order to participate in the medical laboratory science/clinical practicum programs. All applicants are expected to:

1. Manual Dexterity:
   Possess the gross/fine motor skills and hand/eye coordination to safely perform diagnostic procedures which includes performing phlebotomy, using chemicals, specimens, microbiology cultures, laboratory instruments and equipment, and computers

2. Visual Acuity:
- Differentiate different colors and shades, characterize clarity and viscosity of medical specimens, reagents, and chemical reaction end products
- Examine microscopic specimens and be able to differentiate color, shading, and structural differences
- Read text, numbers, and graphs in print, on computer monitors, and hand-writing
- Judge distance, depth, and 2 or 3 dimensional structures

3. Physical, Mental and Emotional Health:
   - Function for an 8 hour work day under stressful conditions
   - Be able to recognize emergency situations and react in an appropriate manner
   - Move around the hospital and laboratory freely and safely
   - Follow verbal directions with normal or corrected hearing
   - Be able to bend, stoop and stand; lift 20 pounds; maintain prolonged sitting or standing positions; perform repetitive tasks
   - Maintain concentration with distractions

4. Behavior:
   - Be able to work independently, with flexibility and be adaptable to change
   - Be willing to work with sharp objects, hazardous chemicals and infectious/biohazardous material
   - Recognize situations that may be potentially hazardous
   - Conduct work with honesty, compassion, ethical behavior and responsible actions
   - Work as a team in regards to learning, tasks, problem solving and patient care

5. Intellectual and Creative Thinking:
   - Perform complex interpretive testing, possess troubleshooting skills, and exercise sound judgement
   - Recognize and correct deviations in testing
   - Prioritize work, be productive, and accurate within realistic time allowances

6. Communication:
   The primary language for all verbal and written communication is English.

   - Understand and follow verbal, non-verbal and written instructions
   - Effectively communicate verbally and in writing
   - Clearly present oral presentations to diverse audiences
   - Comprehend technical materials: text, numbers, math, graphs, textbooks, journals, instructions, internet, manuals, etc.
   - Prepare papers, reports and posters both independently and in group projects
   - Take written, oral, computer and laboratory practical exams at the post-secondary level within established time frames
-Interact and communicate effectively and confidentially with laboratory peers, hospital staff, administration, and patients (it should be noted that patients will be of varying ages, and physical and mental states)
-Use computer software, instructional technology, and the Internet for purposes of communication and education

References:
1. Technical Performance Standards/Essential Functions for MTIMPM Hospital-Based Clinical Practicum Programs 8/12/13
2. ASCLS Essential Functions 2012-2016

Teach Out Plan:

NAACLS requires all accredited programs to implement a “Tech out Plan” in the unlikely event of an unanticipated program closure. In the event of a program closure, students will be notified immediately via email. All enrolled students will be permitted to complete the program. No new students will be admitted into the program. The Program Director will advise potential/prospective students to help acquaint them with local programs.

Part III: Practicum Policies

Criteria for practicum admission (University-based route):

Students seeking practicum placement are expected to have completed all coursework and have a GPA > 2.5. Students must submit application essays to the Clinical Practicum Coordinator. They must demonstrate the qualities and attitudes that are essential to develop as a competent professional in the MLS field (See Affective Domain objectives). Students working in the clinical setting are required to be up-to-date on their immunizations and must be able to provide proof prior to beginning their clinical practicum. Students will also be subject to background checks and drug screens prior to beginning their practicum.

Practicum Course (University-based route):

Practicum students will enroll at Michigan Tech as a non-degree seeking student. The student will register for one, ten credit course, BL4612: SML Clinical Practicum, for the semester they begin their practicum. The clinical practicum will be two semesters and will take students 9 consecutive months to complete. Students will be on-site 40 hours per week for 36 weeks for a total of 1,440 hours.

*Practicum length is subject to change depending on the student’s clinical site and established programs in place. Students who are placed at some clinical sites may be required to complete a portion of their practicum at a nearby affiliated hospital for additional in-depth testing and procedures.
Clinical Practicum Assignment:

The MLS Program Officials anticipate having enough clinical sites for all students seeking placement into a practicum. If a shortage of sites does occur, students will be ranked per GPA in their MLS courses and assigned to clinical sites with regard to their preferred locations. Students who were not placed will be assigned to a clinical site as soon as one becomes available, and the program will make every attempt to avoid situations of delayed placement.

Clinical Practicum Policies & Procedures:

The student is to become familiar with and abide by all rules and policies set forth by the clinical facility to which they are assigned. Failure to comply with any of the on-site policies or respect the authority of the staff will result in removal of the student from the site and potentially the program of study.

Liability Insurance:

Students enrolled in the MLS practicum and carrying out their practicum at an affiliated hospital are covered by professional liability coverage under Michigan Technological University’s self-insurance group, MUSIC (Michigan Universities Self Insurance Corporation).

Performance Objectives:

Students should be able to perform all laboratory procedures described in the performance objectives to the satisfaction of the student, the clinical supervisor and the clinical coordinator. Students should demonstrate a professional and responsible attitude through performance of procedures, concern for patient care and safety, and cooperation and respect for laboratory supervisors and co-workers.

Evaluation:

Clinical instructors will complete the evaluation forms at the end of each departmental rotation. Evaluations will be based on the student’s bench work (psychomotor), as well as their professionalism (affective). Students must receive a satisfactory affective evaluation, and an average of 80% for each psychomotor departmental rotation to successfully complete the clinical practicum. The evaluation forms will become part of the student’s clinical practicum file at Michigan Tech.

Service Work Policy:

1. Students are not to be used as substitutes for qualified staff.
2. Students are only permitted to perform procedures when supervised by qualified staff until competency is established.
3. Laboratory staffing should not rely upon student work.
4. The student’s work in each rotation should be signed/co-signed by the appropriate bench tech.
5. If the student is also an employee, the student will not be evaluated as part of the educational process, when activities are performed while in the employee capacity.

Dismissal of Students:

MLS program officials will monitor student progress during their time at clinical sites. Any of the following behaviors or actions will result in consequences, which may include dismissal from the practicum:

A. Dishonesty
   a. It is important to create a trustworthy atmosphere in the clinical setting. If there is sufficient evidence that a student is lying/cheating, he or she will face one or more of the following consequences:
      i. Permanent removal from the MLS program.
      ii. Suspension of the student from the program for an amount of time to be determined by the Clinical Coordinator and Clinical Supervisor, with the opportunity to continue after suspension
      iii. Receive a letter grade of “F” in the section(s) that were most affected by the behavior

B. Violation of Confidentiality
   a. Patient information is highly confidential. This information may only be disclosed to other laboratory colleagues, the attending physician, the pathologist, and other approved personnel. A violation of confidentiality is a serious problem and will result in one or more of the following consequences described above (under section A).

C. Chronic tardiness or absences
   a. All absences must be approved by the clinical supervisor prior to the day the student is to be absent. Any unapproved absences must be made up by the student before he/she may complete their practicum. In consultation with the Clinical Coordinator, the Clinical Supervisor may recommend appropriate make up times. These may include weekends, afternoon shifts, or at the “end” of the clinical practicum. Excessive tardiness and absences will result in a careful review of the student’s progress and one or more of the above consequences (section A) may follow.

D. Arriving at the clinical site with impaired functional abilities
Arriving at the clinical site under the influence of drugs or alcohol, with lack of sleep, or for any other reason that would prevent the student from satisfactorily performing his or her duties will not be tolerated. One or more of the consequences listed under section A may follow.

Health Information Portability and Accountability Act (HIPAA):

The Health Information Portability and Accountability Act (HIPAA) of 1996 provides the national standard for protecting individuals’ medical records and other personal health information. Students are provided with information on the Privacy Rule while in the MLS program and at pre-practicum orientation. Disclosure of patient information to any unauthorized person could result in fines or imprisonment, and is ground for dismissal from the program. Never discuss patient results outside of the laboratory and do not release any patient information to unauthorized individuals.

Professional Appearance Policy:

Pursuing a career in Medical Laboratory Science results in working directly with patients, physicians, administration, and the public in general. Consequently, your appearance in these situations is important and serves as part of your first impression. Each clinical setting will have their own specific regulations that the student must follow while completing their practicum. While each of these policies may vary slightly, the department has come up with a comprehensive code that reflects the most typical policies found in clinical settings that the student is required to abide by while completing their practicum.

1. No open-toed shoes are to be worn at the clinical site. Athletic shoes may be acceptable, but they must be clean and not scuffed.
2. Fingernails should be kept clean, free from nail polish, and short (a maximum of ¼ in. past the tip of the fingernail), as long nails have been shown to harbor microorganisms. Artificial nails (including but not limited to acrylics, wraps, tips) are prohibited.
3. Hair should be kept neat and clean with no unnatural colors (purple, blue, etc.). Long hair must be neatly pulled back away from the face.
4. Personal hygiene is important and must be maintained throughout the clinical practicum experience. Perfumes and colognes must be avoided, as some patients and colleagues may be particularly sensitive to these.
5. In the event that the student does not wear scrubs, clothing must remain professional. Dress pants and collared shirts are preferred. Cargo pants, shorts, jeans, leggings, yoga pants, and low cut tops are unacceptable.
6. Jewelry and rings should be kept to a minimum, especially those that interfere with proper use of nitrile gloves. Visible body piercings should be limited to just the ears. All other visible body piercings must be removed while in the clinical setting.
7. All visible tattoos should be covered by clothing, long sleeves, etc.
Professional Behaviors:

1. Foul language is inappropriate and should not be used at any time in the clinical setting.
2. Students must treat their coworkers, patients, and other hospital staff with respect at all times.
3. Food and drinks are prohibited in the lab at all times.
4. Cell phones are prohibited in the lab and should only be used during breaks or lunch time. However, it is encouraged that the student limits their use and takes the time to interact with and get to know their colleagues.

Clinical Practicum Appropriate/Recommended Behavior:

As a student:

1. Try to be involved with and observe as many tests and procedures as possible.
2. Use free time during the day to study your notes and textbooks if approved by the clinical supervisor.
3. Establish neat and organized work habits.
4. Ask for assistance with procedures you are unfamiliar with or unsure of. Refer to procedure manuals rather than always using other laboratory staff as a crutch.
5. If you have been sufficiently trained and signed off on a task or test, take the initiative to perform it yourself without waiting to be asked.
6. Review your performance with the clinical supervisor regularly to determine areas in which you can improve.
7. Be sure to follow all hospital, lab, and departmental policies and procedures.
8. Be aware of your departmental rotations throughout the lab, and know who you report to and at what time.
9. Observe all rules on professional appearance and behavior.

As a professional:

1. Always maintain patient confidentiality and abide by all HIPAA regulations.
2. Address patients respectfully and state your name and department upon entering patient rooms. Treat patients and their family members with compassion and empathy.
3. Check patient wristbands or ask for a second identifier, such as date of birth, to ensure you have the correct patient.
4. Always label patient specimens at the bedside – do not remove patient specimens from the room prior to labeling them.
5. Clearly state your name and department when answering the telephone.
6. Always arrive on time.
7. Observe hospital procedures for entering room with special precautions, such as isolation rooms.
8. Follow departmental rules and regulations and observe the dress code.
9. Be respectful of your coworkers and other hospital staff.

Safety:

1. Wash hands regularly and abide by all hand washing regulations set by the clinical site.
2. Proper personal protective equipment (PPE) is to be worn in the laboratory as well as in other areas of the hospital (patient rooms, isolation rooms) as indicated by the clinical site.
3. Be sure that you have been properly trained on all equipment prior to using it.
4. Make sure all tools and equipment is in safe working order.
5. Report any accidents, safety concerns/hazards, defects in tools or equipment to the lab supervisor immediately.
6. Always ask for help before doing anything that you are not confident you can do on your own.
7. Be sure you know where to locate fire extinguishers, as well as how to operate them.
8. Keep flammable material and reagents away from fire and heat.
9. Abide by all safety regulations set by the clinical practicum site.

MTU MLS Program Entry Level Competencies

Specimen Collection:

1. Demonstrate knowledge and proficiency of the following blood collection procedures:
   a. Patient identification and preparation
   b. Collection device selection and usage
   c. Order of draw
   d. Aseptic technique
   e. Specimen labeling and handling
   f. Capillary and venous collection
   g. Proper use of PPE and adherence to hospital safety regulations

Hematology:

1. Identify and describe the cellular components of blood, bone marrow, and body fluids.
2. Identify and describe the function of the cellular components of blood, bone marrow, and body fluids.
3. Prepare and evaluate blood smears in a timely and accurate manner for the following:
a. WBC differentials – normal and abnormal  
b. WBC estimate  
c. Platelet estimate  
d. RBC morphology – normal and abnormal  
4. Correlate cell morphology and patient values with the correct pathological states.  
5. Properly employ the use of various cytochemical stains.  
6. Demonstrate the following manual procedures and/or calculations accurately:  
   a. Erythrocyte sedimentation rate (ESR)  
   b. Reticulocyte counts  
   c. RBC indices  
   d. WBC correction for nucleated RBC’s  
   e. Fluid cell counts  
7. Employ the use of additional routine or confirmatory testing to the level of accuracy established by the laboratory.  
8. Maintain efficient work area by keeping area clean and replenishing supplies and reagents.  
9. For instrumentation and equipment:  
   a. Describe the principle of operation and key components  
   b. Perform necessary calibrations and quality controls  
   c. Identify instrumental causes of unexpected patient results  
   d. Troubleshoot all analyzer malfunctions  
   e. Perform regular preventative maintenance and repairs  

**Coagulation:**

1. List the steps and factors in the coagulation scheme.  
2. Perform automated, semi-automated, and manual testing with the level of accuracy established by the laboratory for the following tests:  
   a. Prothrombin time (INR); with significance of ISI  
   b. Activated partial thromboplastin time  
   c. Fibrinogen  
   d. D-dimer  
   e. Factor assays  
   f. Mixing studies  
   g. Anticoagulant therapy  
3. Correlate patient values with pathological or therapeutic states.  
4. Maintain efficient work area by keeping area clean and replenishing supplies and reagents.  
5. For instrumentation and equipment:  
   a. Describe the principle of operation and key components  
   b. Perform necessary calibrations and quality controls  
   c. Identify instrumental causes of unexpected patient results  
   d. Troubleshoot all analyzer malfunctions  
   e. Perform regular preventative maintenance and repairs  

**Urinalysis:**

1. Explain the structure and function of the urinary tract.
2. Perform automated, semi-automated, and manual testing with the level of accuracy established by the laboratory for the following tests:
   a. Urinalysis
   b. Urine pregnancy tests
   c. Other miscellaneous urinalysis tests
3. Identify, analyze, and report the physical and chemical properties and urine constituents.
4. Identify and explain the presence of normal and abnormal elements found in the microscopic examination of urine sediment.
5. Recognize and explain the presence of contaminants and artifacts in the microscopic examination of urine sediment.
6. Explain the chemical reaction of tests and accurately correlate their results to pathological states.
7. Maintain efficient work area by keeping area clean and replenishing supplies and reagents.
8. For instrumentation and equipment:
   a. Describe the principle of operation and key components
   b. Perform necessary calibrations and quality controls
   c. Identify instrumental causes of unexpected patient results
   d. Troubleshoot all analyzer malfunctions
   e. Perform regular preventative maintenance and repairs

Chemistry:

1. Describe specified clinical chemistry assays with reference to the principles of the procedure and chemical reactions involved.
2. Accurately perform procedures including:
   a. Spectrophotometry
   b. Electrophoresis and densitometry
   c. Enzyme immunoassay
   d. Blood gas analysis
   e. Osmometry
   f. Automated instrumentation analysis
3. Apply the appropriate mathematical calculations to practical laboratory situations.
4. Recognize normal and abnormal patient values and correlate results with pathological or therapeutic states.
5. Maintain efficient work area by keeping area clean and replenishing supplies and reagents.
6. For instrumentation and equipment:
   a. Describe the principle of operation and key components
   b. Perform necessary calibrations and quality controls
   c. Identify instrumental causes of unexpected patient results
   d. Troubleshoot all analyzer malfunctions
   e. Perform regular preventative maintenance and repairs

Microbiology:

1. Perform a variety of bacteriological procedures to demonstrate proficiency in identifying 90% of usually occurring bacteria
2. Perform and accurately interpret the laboratory-established procedures for each of the following:
   a. Inoculation and streaking of aerobic and anaerobic organisms
   b. Gram stain and microscopic examination of clinical materials and culture isolates
   c. Identification of aerobic and anaerobic bacteria by serological, biochemical, and antimicrobial testing
   d. Sensitivity testing
   e. Acid fast staining
   f. Ova and parasites
   g. Fungus identification
   h. Blood cultures
   i. Wet preps
3. Differentiate normal and pathogenic flora.
4. Correlate abnormal patient results with the appropriate pathogenic states.
5. Describe the principles and procedures of molecular testing.
6. Maintain efficient work area by keeping area clean and replenishing supplies and reagents.
7. For instrumentation and equipment:
   a. Describe the principle of operation and key components
   b. Perform necessary calibrations and quality controls
   c. Identify instrumental causes of unexpected patient results
   d. Troubleshoot all analyzer malfunctions
   e. Perform regular preventative maintenance and repairs

Immunohematology:

1. Explain the basic methods and principles of immunohematology testing.
2. Explain the significance of special requirements with regard to:
   a. Patient identification
   b. Specimen labeling
   c. Transcription of results
   d. Record keeping
   e. Release of units for transfusion
   f. Emergency uncrossmatched release
3. Perform the following procedures on patient specimens with 100% accuracy and correct interpretation:
   a. ABO and Rh
   b. Antibody screen
   c. Weak D testing
   d. Antibody identification
   e. Direct and Indirect Antiglobulin tests
   f. Pre-transfusion crossmatch and compatibility testing
   g. Elutions, adsorptions, neutralizations
   h. Titers
   i. Donor unit processing of components
   j. Rh Immune Globulin
k. Transfusion reaction
4. Describe, perform, evaluate, and interpret immunohematology testing required for blood and blood component therapy
5. Correlate results with patient condition.
6. Describe blood components currently available for therapeutic use with regard to:
   a. Storage
   b. Preparation
   c. Infusion
   d. Indications for use
   e. Leukocyte reduction methods
   f. Irradiation
   g. Autologous/directed donation
7. List the general health requirements, disease markers, and reasons for exclusion of potential blood donors
8. Select the appropriate components for patient transfusion given their blood type, antibody screen, and patient history.
9. Appropriately prioritize patient work with regard to urgency of the situation.
10. Maintain efficient work area by keeping area clean and replenishing supplies and reagents.
11. For instrumentation and equipment:
   a. Describe the principle of operation and key components
   b. Perform necessary calibrations and quality controls
   c. Identify instrumental causes of unexpected patient results
   d. Troubleshoot all analyzer malfunctions
   e. Perform regular preventative maintenance and repairs

Immunology/Serology:
1. Identify the cells and organs of the immune system and explain their functions.
2. Describe immunologic principles for the method of testing performed, including the limitations of the test system and diagnostic significance of the results.
3. Accurately perform or discuss the following procedures:
   a. Serologic screening, serial dilutions and titers
   b. Flocculation, latex and RBC agglutination
   c. Precipitation methods
      i. RID
      ii. Ouchterlony
   d. Immunelectrophoresis/Immunofixation
   e. ELISA
   f. Direct and indirect immunofluorescence
   g. Flow cytometry
4. Maintain efficient work area by keeping area clean and replenishing supplies and reagents.
5. For instrumentation and equipment:
   a. Describe the principle of operation and key components
b. Perform necessary calibrations and quality controls

c. Identify instrumental causes of unexpected patient results
d. Troubleshoot all analyzer malfunctions
e. Perform regular preventative maintenance and repairs

Management/Education:

1. Distinguish between cognitive, affective, and psychomotor domains.
2. Prepare a resume and cover letter.
3. Explain routine maintenance and calibration of laboratory equipment and identify necessary corrective action to maintain quality controls.
4. Identify and explain pre-analytical, analytical, and post-analytical sources of error in laboratory testing.
5. Explain the principles of laboratory management, supervision, and continuing education.
6. Demonstrate communication skills with all levels of hospital personnel while maintaining professional and ethical conduct.
7. Describe the integration of laboratory information systems (LIS) with electronic health records.
8. Discuss the process of certification, accreditation, proficiency and competency testing, and laboratory inspection.