Oregon Tech
Oregon Health & Science University
Medical Laboratory Science Program

2022 Externship Handbook

Oregon TECH
Medical Lab Science

OHSU

OREGON INSTITUTE OF TECHNOLOGY/ OREGON HEALTH & SCIENCE UNIVERSITY

Medical Laboratory Science

CLINICAL EXTERNSHIP HANDBOOK 2022

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Oregon Tech ● Oregon Health and Science University
Medical Laboratory Science Program
EXTERNSHIP HANDBOOK 2022

I. INTRODUCTION

The Medical Laboratory Science (MLS) program operates as a collaborative effort between Oregon Institute of Technology (OIT) and Oregon Health & Science University (OHSU). The program has been developed to be consistent with the "Essentials of Accredited Educational Programs for the Clinical Laboratory Scientist/Medical Technologist" guidelines, adopted by the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS**).**

The OIT · OHSU MLS program is accredited by:

NAACLS
5600 N. River Rd.
Suite 720
Rosemont, Illinois 60018-5119
(773) 714-8880
www.naacls.org

Successful completion of all program requirements leads to a joint baccalaureate degree from OIT and OHSU. Graduates of the MLS Program are eligible to take the nationally recognized certifying examination for Medical Laboratory Scientist (MLS) given by the American Society of Clinical Pathologists (ASCP) Board of Certification (BOC). Conferment of the baccalaureate degree is not contingent upon passing the certification examination.

It is the policy of OIT and OHSU that all persons shall be treated equally and fairly, and an environment free of illegal discrimination and harassment shall be maintained. The Universities expressly prohibit discrimination based on race, color, gender, marital status, national origin, age, disability, religion, pregnancy, sexual orientation, gender identity or expression, or any other consideration not directly and substantively related to effective performance, and in compliance with all relevant federal, state and local laws and regulations. This commitment includes promoting discourse and activity which seeks to enhance campus diversity, and which mirrors the pluralism of our society; ensuring prompt and impartial consideration of any discrimination complaint; and equitably resolving any such complaint found to have merit.

II. EDUCATION MISSION

The mission of the Oregon Tech • OHSU Medical Laboratory Science Program is to educate, train, and graduate professionally competent and ethical individuals, committed to life-long learning, and who are prepared to meet current and future workplace challenges in medical laboratory science.

III. EXTERNSHIPS

Part of the externship course work involves a Simulated Lab Experience. This consists of a two-week period where students will complete assignments and exercises designed to simulate a working clinical lab. This is intended to get students accustomed to the workflow and problem solving encountered in a clinical lab by applying principles learned in the didactic and student lab portions of the program. Upon successful completion of on-campus coursework, students are assigned to complete 12 weeks of clinical training represented by four distinct externship courses and one enrichment experience. This has been designed as a generalist experience to accommodate our clinical sites and to be an equitable student experience.
The 12 weeks are divided into the following training periods:

MLS 470	Chemistry and Immunology Externship	3 weeks
MLS 471	Hematology Externship (Includes hemostasis & urinalysis)	3 weeks
MLS 472	Microbiology Externship	3 week
MLS 473	Immunohematology Externship	3 week
MLS 463	Foundations of MLS III	Completed during the 12 weeks

Externships may be completed in any sequence and at more than one training site. The MLS program collaborates with the clinical sites to develop mutually agreed upon schedules that meet the needs of both the students and clinical sites.

IV. PROGRAM POLICIES

Essential Requirements

The Oregon Tech • OHSU MLS program has established *non-academic standards* of performance defined as *essential requirement*s. These essential requirements are in accordance with the Americans with Disabilities Act (PL101-336) and the standards of the National Accrediting Agency for Clinical Laboratory Sciences (NAACLS).

Expectations of Mastery and Skill in Information Acquisition and Communication

A. Students must demonstrate the ability to acquire and to communicate information. Specifically, a program student must be able to:

1. Read for comprehension and follow verbal and written instructions to demonstrate mastery of information presented in coursework, including relevant content in basic science and clinical courses, at a level deemed appropriate by the faculty.
2. Effectively communicate in written and spoken English in order to transmit information to faculty, staff, peers, and members of the healthcare team.
3. Make a correct judgment in seeking supervisory help and consultation in a timely manner.
4. Competently utilize technology to research, investigate, acquire and present information obtained by observation and experimentation.
5. Use strategies that minimize miscommunication.

6. At all times and in all circumstances, follow established procedures to safeguard protected patient information communicated by non-electronic and electronic means.

Expectation of Motor and Sensory Functions

B. Students must demonstrate sufficient motor and sensory function to execute movements required to carry out work assignments in all phases of diagnostic testing, including pre-analytical, analytical, and post-analytical. Specifically, a program student must be able to:

1. Distinguish physical and/or chemical attributes, including color, shape, size, and fine detail of objects both macroscopically and microscopically.
2. Demonstrate sufficient dexterity to safely manipulate specimens, laboratory utensils, tools, equipment and instrumentation including computer touch-screens, keyboards and handheld calculators, necessary to obtain and report complete and accurate diagnostic test results.
3. Demonstrate adequate mobility to attend to duties in the various locations of the medical laboratory work environment.
4. Use sensory skills to acquire and apply information presented by various means and media, including demonstrations.
5. Perform sustained, often repetitive physical activity that may require sitting, standing and/or walking for prolonged periods of time.
6. Accurately read, record, and when necessary, respond to numbers, letters and symbols displayed in print whether transmitted through non-electronic, electronic or other technological media.
7. Demonstrate proficiency performing a wide range of tests in areas of the contemporary medical laboratory including but not limited to immunology, hematology, clinical chemistry, immunohematology, microbiology, molecular, hemostasis, urinalysis, body fluids, parasitology, mycology, virology and other emerging diagnostic venues.

Expectations of Professionalism

C. Students must project an image of professionalism through behavior, speech, and grooming. Each student is to possess requisite knowledge and skill and safely perform a wide variety of test procedures with precision and accuracy. Specifically, a program student must be able to:

1. Follow established laboratory safety protocols when working with various sample types including blood, urine, and other body fluids and tissues, and with microbial organisms that may be infectious, and hazardous chemicals.
2. Work accurately and safely under high stress and time constraints to make subjective evaluations and decisions when mistakes may have a negative and/or high impact on patient care.
3. Adapt to changing environments, maintain a professional demeanor and concentration in distracting situations.
4. Demonstrate attributes that include integrity, responsibility, and tolerance.
5. Speak, act, and perform all work in an ethical manner as defined by the ASCLS professional code of ethics. See https://ascls.org/code-of-ethics/
6. Show respect for self and others.
7. Work independently as well as cooperatively with others, performing professional obligations in a timely, responsible manner.

Attendance

Attending class and participating in course activities is vital to the scholarship and professional development of each Oregon Tech • OHSU MLS program student. Consequently, student attendance and participation in all activities assigned by the training sites is mandatory and monitored. Additionally, students are reminded that once training schedules have been determined, many people are inconvenienced by last minute schedule changes. Students' employment and, whenever possible, personal obligations *ARE NOT* to be planned for or engaged in during scheduled training time and are not viable excuses for missing training time. Students are provided site-specific training schedules that cannot be changed without advanced permission from the program clinical coordinator in consultation with the training site.

With a few exceptions, students are scheduled to be in training according to a routine Monday – Friday, 8-hour day-shift cycle. If training during non-day shifts, holidays or weekends is deemed necessary by the clinical site, a written request to the program clinical coordinator must be submitted prior to the student beginning the altered schedule. The request must include a justification for the altered training schedule. In addition, the student(s) at the site must be informed and receive a copy of the altered schedule. Training scheduled for non-day shifts, holidays or weekends counts toward the 40-hour/week schedule. In no case will additional hours beyond the 40-hour/week be scheduled or required.

- The few exceptions when students are not expected to be in training include scheduled, officially authorized Oregon Tech holidays and school closures due to adverse weather (Portland metro area).

  Holidays include:

  - Nov 11th, Veterans Day
  - Thanksgiving Nov 23-25th
  - Students are not expected to be in training during other official holidays observed by their assigned clinical site.
  - If students need to make up any time for illness, they could do so during these holidays, if the site approves.

If a student requires time off from training for religious purposes, they must submit a written request to the program clinical externship coordinator at least two weeks prior to the anticipated date(s) of absence. The request must include the dates and times the student anticipates absence from training. The program clinical coordinator will work with faculty and the student's assigned training site(s) to make reasonable accommodation for the student's absence. A written copy of the accommodation is provided to the student, to the training site(s), and a copy is placed in the student's program file.

At the start of every externship rotation, each student should discuss with their clinical site supervisor any potential conflicts that might interfere with attendance. To assist in determining what constitutes excused versus unexcused absence from training, the following policies apply:

1. **Excused Absences:** Absences will be considered "excused" when due to:
   a. Student illness/injury - The program reserves the right to request a health care provider's excuse for any extended absence due to illness beyond two consecutive days.
   b. Immediate personal or family emergency
   c. Anticipated absence "excused" *in advance by the appropriate faculty member and the clinical site.*

d. **A student is required to make up all time lost as a result of excused absences unless specifically exempted by the clinical site coordinator and appropriate MLS faculty member.**

i) In the event of an emergency or illness necessitating absence from the clinical rotation, students are to **notify the clinical site, the site's clinical coordinator and the appropriate program faculty member as soon as possible.** Messages left for the program must include student's name, clinical site, verification that the clinical site has been notified, person notified at the clinical site, reason for absence (illness or emergency), and a telephone number where the student may be reached.

ii) Whenever possible, elective personal appointments for medical, dental or other reasons should be made on a student's own time. Anticipated absences for health-related reasons or unavoidable difficulties must be requested in writing and **approved by the appropriate faculty member in advance. THEN** permission must be requested from the clinical externship site.

iii) **Inclement weather**: The student must make a common-sense judgment about attempting to negotiate driving if the weather is inclement. Missed time will be rescheduled as soon as possible. If a student is unable to make it to their assigned area, they should contact their clinical site coordinator or clinical department contact and appropriate program faculty member.

2. **Unexcused absences:** Attendance at clinical rotations at the scheduled time and date is mandatory. Any missed days or hours not approved are unexcused.
   a. Unexcused absences will not be tolerated and, as a professional development issue, may be referred to the Progress and Promotions Committee for appropriate action at the discretion of the faculty member.
   b. **Time missed for an unexcused absence will not be made up and the attendance grade for that rotation will be affected per the course syllabus.**

V. EMPLOYMENT

Laboratories must follow federal and state regulations regarding employment practices. The qualifications of employees, the type of tasks that can be performed and the need for supervision are solely the decision of the employer. If a student is offered employment during the externship, how they qualify for employment and who hires and supervises them is arranged between the employer and student. However, ***at no time and under any circumstance during scheduled training is any student to be substituted for regular laboratory staff or scheduled to work as a paid employee of the clinical affiliate.***
Students are encouraged to keep the number of outside employment hours at a minimum during their externship.

VI. INTERNATIONAL STUDENTS

International students on a F-1 VISA ***must*** contact the Portland-Metro campus international student representative to ***fill out a CPT application*** so that you are eligible for the externship rotations**.**

VII. HEALTH INSURANCE

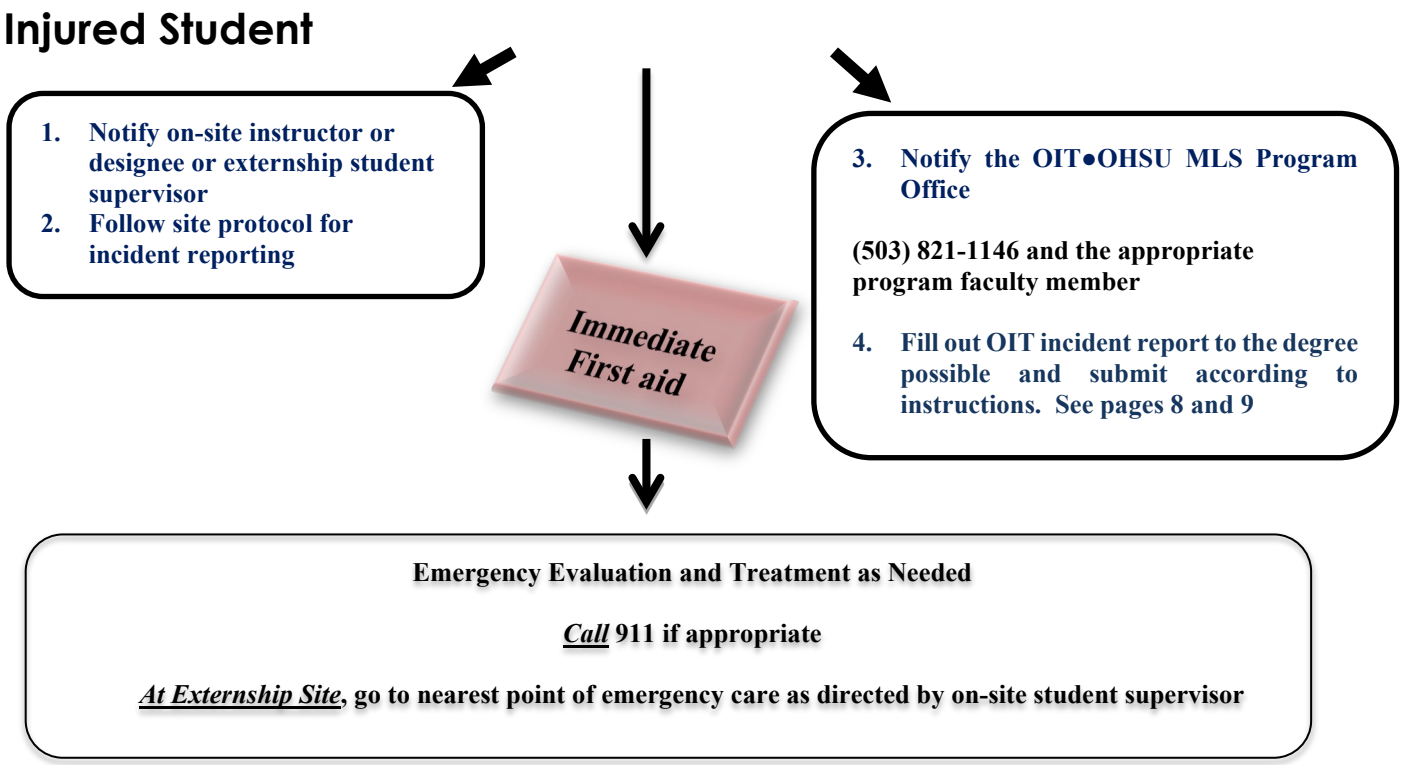
Students are required to carry major medical insurance. This is verified through American Databank Verification Services.

VIII. INJURY POLICY

Handling Student Injury *NOT* Involving Bloodborne Pathogen Exposure

Should a program student have an accident or suffer an injury during class on the Oregon Tech – Wilsonville campus or during a clinical externship rotation that **DOES NOT *involve exposure to bloodborne pathogens***, the following actions should be taken:

Procedure



Handling Student Injury Involving Bloodborne Pathogen Exposure

Should a program student have an accident or suffer an injury during class on the Oregon Tech – Wilsonville campus or during a clinical externship rotation that **DOES *INVOLVE EXPOSURE TO BLOODBORNE PATHOGENS***, the following actions should be taken:

Procedure

- **EMERGENCY EVALUATION, TREATMENT, COUNSELING & EDUCATION**
  - **MANDATORY FOLLOW-UP**

Injured Student

1. **Notify on-site instructor or designee or externship student supervisor**
2. **Follow site protocol for incident reporting**

Immediate First aid

3. **Notify the OIT•OHSU MLS Program Office**

(503) 821-1146 and the appropriate program faculty member

4. **Fill out OIT incident report to the degree possible and submit according to instructions. See pages 8 and 9**

Emergency Evaluation, Treatment, *COUNSELING AND EDUCATION* as Needed

***Call* 911 if appropriate**

***At Externship Site*, go to nearest point of emergency care as directed by on-site student supervisor and follow site's workplace blood borne pathogen exposure control plan.**

MANDATORY follow-up with OIT student health services regardless of where the injury occurred.

Oregon Institute of Technology
INCIDENT REPORT

Office of Risk Management – Klamath Falls
3201 Campus Drive, Snell Hall 112
Klamath Falls, OR 97601
Phone: 541-885-1133

Office of Risk Management – Wilsonville
27500 SW Parkway Ave
Wilsonville, OR 97070
Phone: 503-821-1277

Instructions: To be completed **WITHIN 24 HOURS** of an accident, incident or condition and returned to Risk Management at one of the above addresses. This Incident Report is **not** to be used for employee work-related accidents, incidents or conditions. **Complete ALL sections**, do not leave any blanks. Attach additional sheets if necessary to describe this incident.

Date of Report _____ Incident Date _____ Incident Time _____

Information:

Name: _____
Last MI First

Address: _____

Home Phone: _____ Cell Phone or Other: _____

Email: _____

Date of Birth: _____ Gender: _____

Affiliation: ☐ Student ☐ Volunteer ☐ Guest/Visitor ☐ Vendor/Contractor

Injury Information:

Treatment
- ☐ Received onsite first aid
- ☐ Will be seeking medical treatment
- ☐ Received medical treatment
- ☐ Hospital transport
- ☐ Fatality
- ☐ No treatment
- ☐ Other _____

Work Status
- ☐ Missed work, dates: _____
- ☐ No missed work

Nature of Injury
- ☐ Burn ☐ Inflammation/irritation
- ☐ Bruise ☐ Scratches/abrasions
- ☐ Cut ☐ Sprain/strain
- ☐ Other _____

Body Part Affected _____
☐ Left ☐ Right ☐ Both

Cause of Injury
- ☐ Burned by: _____
- ☐ Cut by: _____
- ☐ Contact with: _____
- ☐ Struck by: _____
- ☐ Needle/Sharp Stick: *Complete additional Exposure Incident Report Form*

Fall/Slip/Trip
- ☐ Different level ☐ Same level ☐ Floor condition
- ☐ Weather condition ☐ Over object ☐ On sidewalk/path
- ☐ On stairs

Blood
Was blood present? ☐ Yes ☐ No
Was Individual exposed to someone else's blood? ☐ Yes ☐ No
Source of other blood? _____

Law Enforcement Response
- ☐ Oregon Tech Public Safety
- ☐ Police

1. **Full Name and Phone Number of any Witnesses:**

2. **What was the Individual's purpose for being on campus?**

3. **What was the Individual doing and where did the incident occur? Describe the activity. *Be specific*:** Example: "Leaving College Union through the south double doors."

4. **What happened? How did the injury/incident occur? *Be specific*:** Example: "There was a tear on the carpet; visitor's shoe got caught on the torn piece of carpet."

5. **What was the injury, illness or incident? Describe the part of the body that was affected and how. Be more specific than "hurt" or "sore".** Examples: "possible strained lower back", "possible sprained left ankle".

6. **What object or substance directly caused the injury? If not applicable, indicate "N/A".** Examples: "slippery floor caused by water", "loose bricks on walkway".

7. **Additional Information:**

Signature: _____ **Date:**_____

IX. PROFESSIONAL LIABILITY

While at externship training sites students enrolled in the OIT • OHSU Medical Laboratory Science Program are covered through OIT professional liability insurance which students purchase Fall term (student fee).

X. EXPECTATIONS AND RESPONSIBILITIES OF THE CLINICAL SITE:

(**NOTE:** For information on the completion of required forms, **see Academic Standards (pp. 23-24) and Quick Check List for Clinical Sites (p. 14)**

The clinical externship affords the student the opportunity to perform a variety of procedures under the supervision of a certified medical laboratory scientist. The student must have mastered an acceptable level of competency within the academic portion of the curriculum before proceeding into the clinical setting.

The cognitive skills of the students and the application of these skills are evaluated throughout all phases of the education process.

Development of advanced psychomotor skills occurs primarily in the clinical externship experience.

The student's affective domain skills will be strengthened within the professional environment of the clinical site.

Students begin clinical participation by first observing the clinical instructor. This participation should move from the passive mode of observation to the more active mode of assisting. The rate of student progress is dependent upon the ability of the student to use the equipment, to comprehend and perform the various tasks assigned. As soon as the student feels confident with the equipment and procedures, they may perform the procedures under the direction of the clinical instructor. As the student gains experience, independent clinical performance under supervision should be introduced. After developing competency, the student should continue to perform the procedures to retain proficiency and develop additional self-confidence. Students should be provided an opportunity to develop additional skills and responsibilities associated with working in a clinical laboratory such as answering phones, keeping records and maintaining equipment.

Students are expected to use externship time wisely. When not performing clinical laboratory duties, the student **should first check with the clinical instructor** and consider the following activities.

1. **Ask if there are other duties that the student can perform or help with**.
2. Read SOP's
3. Review textbooks available in the department
4. Review medical journals
5. Work on homework / study

The student is evaluated after each clinical rotation. If possible, it is preferred that multiple evaluators assess the student's performance. If more than one Professional Development Evaluation is submitted, an average of the evaluations will be used. **If it is perceived that a student will receive a below expectations score in any evaluation category, the student and appropriate faculty member must be notified as soon as the deficiency becomes apparent. This will give the student an opportunity to improve that skill before a final evaluation is made.**

OIT•OHSU MLS Professional Development Evaluation

Student Name: _____ **Rotation Dates:** _____
Clinical Site: _____ **Clinical Rotation:** _____

Objective: The primary objective of this assessment is to ensure that each student completes the program with a level of technical competency and demonstrates the behavioral standards of the profession.

Instructions: The student will be evaluated after each of the clinical rotations. For each clinical rotation, it is preferred that multiple evaluators assess the student's performance if possible. If more than one evaluation is submitted, an average of the evaluations will be used.

Evaluator: Select the description which most closely matches the student's performance.

- A score of 3 indicates the student exceeds expectations of competency for **a student at a MLS entry level**.
- A score of 2 indicates the student meets expectations of competency for **a student at MLS entry level.**
- A score of 1 indicates minimal competency has not been met.

Scores of 1 require additional comments documenting why the score was chosen.
***If it is perceived that a student will receive a below expectations score in any category, the student and the appropriate faculty member must be notified as soon as the deficiency becomes apparent**.

Knowledge and Skills

Students are expected to receive scores of 2's and 3's. If a student receives a score of 1 in this section, it is considered unsatisfactory performance. It will be referred to the Progress and Promotions Committee.

Exceeds Expectations	Meets Expectations	Below Expectations	Not Applicable or Not Observed
Circle score of 3	Circle score of 2	Circle score of 1	Circle NA

Application of Knowledge	1	Readily able to answer theory and practical questions with little prompting	**3 2 1 NA**
	2	Applies previous knowledge to new procedures with minimal instruction	**3 2 1 NA**
Laboratory Performance	3	Follows laboratory and institutional safety policies	**2 1 NA**
	4	Follows written procedures / verbal instruction	**2 1 NA**
	5	Uses proper laboratory technique	**2 1 NA**
	6	Makes minimal errors	**3 2 1 NA**
	7	Performs appropriate quality control / quality assurance procedures	**2 1 NA**
	8	Maintains work quality and quantity under stress	**3 2 1 NA**
	9	Able to work independently; requires minimal supervision	**3 2 1 NA**
Laboratory Results	10	Obtains accurate and precise results	**3 2 1 NA**
	11	Records completely, clearly and accurately	**2 1 NA**
Utilization of Time	12	Reasonable pace of work; able to keep up with workflow	**3 2 1 NA**
	13	Utilizes time effectively	**2 1 NA**
	14	Usually completes workload or assignments in normal amount of time	**2 1 NA**
Organization	15	Organizes material and work	**2 1 NA**
	16	Establishes priorities	**3 2 1 NA**
Problem Solving Skills	17	Recognizes errors in technique, results and/ or instrument malfunction	**3 2 1 NA**
	18	Shows logical thinking and resourcefulness in dealing with problems	**3 2 1 NA**
	19	Determines course of action after careful analysis of all available data	**3 2 1 NA**
	20	Perseveres, reluctant to abandon a problem without resolution	**3 2 1 NA**

Habits and Attitudes

Students are expected to receive scores of 2's and 3's. If a student receives a score of 1 in this section, it is considered unsatisfactory performance and may be referred to the Progress and Promotions Committee at the discretion of appropriate faculty member.

Exceeds Expectations	Meets Expectations	Below Expectations	Not Applicable or Not Observed
Circle score of 3	Circle score of 2	Circle score of 1	Circle NA

Initiative	21	Performs routine assigned tasks	**2 1 NA**
	22	Seeks unsolicited tasks	**3 2 1 NA**
	23	Works on improving skills	**3 2 1 NA**
Interest	24	Asks relevant questions	**3 2 1 NA**
	25	Alert and attentive	**3 2 1 NA**
Responsibility	26	Completes required assignments / tasks	**2 1 NA**
	27	Accepts responsibility as delegated	**2 1 NA**
	28	Is rarely absent	**2 1 NA**
	29	Notifies appropriate personnel when late or absent	**2 1 NA**
	30	Reports out when leaving	**2 1 NA**
Interpersonal Relations	31	Maintains good working relationship with co-workers and peers	**3 2 1 NA**
	32	Functions well in a teacher / student setting	**3 2 1 NA**
	33	Helps others willingly	**3 2 1 NA**
Professional Performance	34	Accepts constructive criticism, open to suggestions	**3 2 1 NA**
	35	Maintains professional composure in stressful situations	**3 2 1 NA**
Integrity	36	Demonstrates integrity and ethical behavior	**2 1 NA**
	37	Admits to errors or mistakes	**2 1 NA**
	38	Follows procedures without shortcuts	**2 1 NA**
Cleanliness/ Orderliness	39	Leaves work area clean and in good order	**2 1 NA**
	40	Replenishes supplies and reagents	**2 1 NA**
Promptness	41	Arrives on time	**2 1 NA**
	42	Begins work promptly	**2 1 NA**
	43	Returns from break when directed	**2 1 NA**
Confidence	44	Displays confidence after appropriate time and instruction	**3 2 1 NA**
	45	Recognizes limitations and asks for help when needed	**3 2 1 NA**
Institutional & Laboratory Policies	46	Adheres to general policies	**2 1 NA**
	47	Follows dress code	**2 1 NA**
	48	Maintains patient confidentiality and dignity	**2 1 NA**
Communication	49	Listens well	**3 2 1 NA**
	50	Receives/ gives information to others effectively & courteously	**3 2 1 NA**

How would you rate this student for employment in this rotation?

_____ **Recommend** _____**Not Recommend (**Please provide an explanation)

Evaluator Comments (Please use additional paper if needed)

_____

Signature of Evaluator _____ **(Date)**_____

Evaluator: Please review this evaluation with the student.

Student Comments: (if desired, please use additional paper if needed)

I have reviewed this evaluation: _____

Signature of Student **(Date)**

CLINICAL SITE RESPONSIBILITY QUICK CHECKLIST

Professional Development Evaluations are to be returned to the MLS program by **5 pm on the last day of each student rotation.** Grades must be calculated and reported to the Registrar's office so that students can graduate on Saturday, December 11th.

Please retain a copy of all submitted paperwork for your files.

OIT*OHSU Medical Laboratory Science Program
Attn: Appropriate Faculty Member or Deb Disko
27500 SW Parkway
Wilsonville, OR 97070
Office Phone (503) 821-1146
Email: (preferred method of delivery) to appropriate faculty member or deb.disko@oit.edu
Fax: (503) 218-1126

Clinical Sites are responsible for returning the following to the MLS program:

NOTE: A master copy of the Student Professional Development Evaluation Form is on pages 11-13. ***Once you go over it with students and it is signed you can email it to the instructor or the student can upload it to Canvas.***

Chemistry/Immunology

- ✓ Completed Student Professional Development Evaluation Form (pp. 11-13)

Hematology/Hemostasis /Urinalysis

- ✓ Completed Student Professional Development Evaluation Form (pp. 11-13)

Microbiology/Serology

- ✓ Completed Student Professional Development Evaluation Form (pp. 11-13)

Immunohematology

- ✓ Completed Student Professional Development Evaluation Form (pp. 11-13)

XI. GOALS, OBJECTIVES AND COMPETENCIES

Program Goals

The goals of the Oregon Tech • OHSU MLS program are to:

1. Advance an innovative curriculum that meets current and emergent pedagogical and professional development needs of students.
2. Identify, establish, and maintain partnerships with community medical laboratories that provide exceptional educational experiences.
3. Provide learning experiences rich in opportunities that maximize every student's potential to achieve MLS career entry-level competencies**.**
4. Graduate competent MLS that meet the workforce needs of Oregon and underserved regions of the nation**;** and contribute to the advancement of MLS pedagogy and growth of the profession.

Affective Objectives

While in the clinical externship a student should demonstrate the following:

A. Professional Characteristics

1. Arrive in the laboratory and begin work promptly; stay for scheduled time (consider initial daily arrival and departure; return from lunch and coffee breaks).
2. Call in a timely fashion when an illness or emergency delays or prevents arrival in the laboratory.
3. Listen carefully, follow verbal instructions and seek clarification, if necessary.
4. Follow written instructions when performing laboratory procedures.
5. Repeat procedure, if results are illogical, without being asked to do so.
6. Demonstrate a sense of responsibility and integrity in the performance of procedures.
7. Organize work efficiently.
8. Complete an appropriate volume of work.
9. Perform appropriate quality control procedures.
10. Perform appropriate quality assurance, e.g. assess specimen acceptability, evaluate logic of results prior to accepting/reporting results, etc.
11. Critically review own work to avoid errors.
12. Admit mistakes.
13. Make appropriate decisions in routine, as well as complex situations, as deemed necessary.
14. Openly seek feedback and suggestions for improvement.
15. Follow laboratory safety rules for handling/disposal of hazardous material.
16. Treat patient information as confidential, discussing only in the appropriate setting.
17. Access additional laboratory data on patient through the LIS only on a "need to know" basis.
18. Handle specimens and laboratory equipment with skill and dexterity.
19. Attend continuing educational programs offered as work schedule allows.

B. **Initiative**

1. As time permits, work on improving skills once proficiency is attained.
2. Volunteer to assist others and look for tasks to do, as skills permit, and do them without being asked.
3. Accept responsibility as delegated.

C. **Interpersonal Skills**

1. Show awareness of and respect for staff and peers' feelings and needs.
2. Cooperate, work effectively as a team member with staff and peers.
3. Accept and use constructive criticism.
4. Stay calm during interruptions/stressful times.
5. Demonstrate respect for patient dignity.
6. Clearly convey information orally that is important to laboratory staff and/or other personnel. (e.g. physicians, nurses etc.)
7. Clearly and legibly communicate information in written form.

Program Student Learning Outcomes (PSLOs) addressed by Externship Courses

Seven measurable program specific learning outcomes have been defined that encompass both the university standards (Communication, Inquiry & Analysis, Ethical reasoning, Teamwork, Quantitative Literacy and Diverse perspectives) and the objectives of the MLS program.

1. Competency to perform a full range of testing in the contemporary medical laboratory encompassing pre-analytical, analytical, and post-analytical components of laboratory services, including immunology, hematology, clinical chemistry, immunohematology, microbiology, molecular, hemostasis, urinalysis, body fluids, parasitology, mycology, virology and other emerging diagnostic venues.
2. Proficiency to problem-solve, troubleshoot, and interpret results, and to use statistical approaches when evaluating data.
3. Professional and ethical conduct, respecting the feelings and needs of others, protecting the confidence of patient information, and never allowing personal concerns and biases to interfere with the welfare of patients.
4. Maintaining appropriate composure under stressful conditions.
5. Administrative skills consistent with philosophies of quality assurance, continuous quality improvement
6. Application of safety and governmental regulations and standards as applied to medical laboratory practice.
7. Effective communication skills to ensure accurate and appropriate information transfer.

Program Educational Objectives (Career Entry Competencies) *

Upon completion of the Oregon Tech • OHSU MLS Program, a student will have had opportunity to acquire knowledge and skills and develop professional attributes of a Medical Laboratory Scientist. Consequently, at the time of graduation, graduates will have demonstrated:

1. Competency to perform a full range of testing in the contemporary medical laboratory encompassing pre-analytical, analytical, and post-analytical components of laboratory services, including hematology, chemistry, microbiology, urinalysis, body fluids, molecular diagnostics, phlebotomy, and immunohematology
2. Proficiency to problem-solve, troubleshoot, and interpret results.
3. Active participation in the development, implementation, and evaluation of test methods
4. Responsibility for analysis and decision-making
5. Application of safety and governmental regulations and standards as applied to medical laboratory practice.
6. Maintain appropriate composure under stressful situations
7. Professional conduct, respecting the feelings and needs of others, protecting the confidence of patient information, and never allowing personal concerns and biases to interfere with the welfare of patients.

Additionally, graduates will possess relevant experience in or exposure to:

1. Interpersonal and interdisciplinary communication interactions with members of healthcare teams, external relations, customer service and patients
2. Medical laboratory finance, operations, marketing, and human resource management
3. Using information technology to effectively and accurately report laboratory-generated information
4. Research design and practice

(*Modified from the NAACLS Guide to Accreditation, "Description of Career Entry of the Medical Laboratory Scientist" and "Curricular Requirements", 2008.)

XII. EXPECTATIONS AND RESPONSIBILITIES OF THE STUDENTS

Students will enter each externship rotation with an understanding of the theoretical basis for tests and test procedures, the basic skills and manual techniques associated with each rotation.

During each externship rotation, students shall organize their work, improve their skills and apply their knowledge and understanding. Students shall have an opportunity to correlate their laboratory work with patient diagnosis and care.

Students will take responsibility for completing each competency check list, applicable proficiencies and other assignments for each externship rotation (if required), and student evaluation of externship, and for turning them in on time.

These opportunities have been designed for the students' growth and development. Students are expected to take advantage of all opportunities to improve and grow. Students should be moving from the role of the student to the role of entry level medical laboratory scientist. Be alert to the needs of others in the laboratory, learn to work with the team (possibly helping others when not busy in your own assigned rotation) and increase your curiosity regarding patients and laboratory results. Learn how to investigate and locate information.

EXHIBIT A OF OUR CLINICAL AFFILATION AGREEMENTS

TEACHER-LEARNER EXPECTATIONS

The Sending Agency holds in high regard professional behaviors and attitudes, including altruism, integrity, respect for others, and a commitment to excellence. Effective learning is best fostered in an environment of mutual respect between teachers and learners. In the context of health care education, the term "teacher" is used broadly to include peers, resident physicians, full-time and volunteer faculty members, clinical preceptors, nurses and ancillary support staff, as well as others from whom students learn.

GUIDING PRINCIPALS:

Duty: Health care educators have a duty not only to convey the knowledge and skills required for delivering the profession's standard of care, but also to instill the values and attitudes required for preserving the health care profession's social contract with its patients.

Integrity: Learning environments that are conducive to conveying professional values must be based on integrity. Students and residents learn professionalism by observing and emulating role models, who epitomize authentic professional values and attitudes.

Respect: Respect for every individual is fundamental to the ethic of health care. Mutual respect is essential for nurturing that ethic. Teachers have a special obligation to ensure that students and residents are always treated respectfully.

RESPONSIBILITIES OF TEACHERS AND LEARNERS:

Teachers should:

- Treat students fairly and respectfully
- Maintain high professional standards in all interactions
- Be prepared and on time
- Provide relevant and timely information
- Provide explicit learning and behavioral expectations early in a course
- Provide timely, focused, accurate and constructive feedback on a regular basis and thoughtful and timely evaluations at the end of a course
- Display honesty, integrity and compassion
- Practice insightful (Socratic) questioning, which stimulates learning and self-discovery and avoid overly aggressive questioning which may be perceived as hurtful, humiliating, degrading, or punitive
- Solicit feedback from students regarding their perception of their educational experiences
- Encourage students who experience mistreatment or who witness unprofessional behavior to report the facts immediately

Students should:

- Be courteous of teachers and fellow students
- Be prepared and on time
- Be active, enthusiastic, curious learners
- Demonstrate professional behavior in all settings
- Recognize that not all learning stems from formal and structured activities
- Recognize their responsibility to establish learning objectives and to participate as an active learner
- Demonstrate a commitment to life-long learning, a practice that is essential to the profession of medicine
- Recognize personal limitations and seek help as needed
- Display honesty, integrity, and compassion
- Recognize the privileges and responsibilities coming from the opportunity to work with patients in clinical settings
- Recognize the duty to place patient welfare above their own
- Recognize and respect patients' rights to privacy
- Solicit feedback on their performance and recognize that criticism is not synonymous with "abuse"

Relationships between Teachers and Students

Students and teachers should recognize the special nature of the teacher-learner relationship which is in part defined by professional role modeling, mentorship, and supervision. Because of the special nature of this relationship, students and teachers should strive to develop their relationship to one characterized by professionalism, mutual trust, acceptance, and confidence. They should both recognize the potential for conflict of interest and respect appropriate boundaries.

STUDENT ASSIGNMENTS
(Please upload to Canvas)

Immunohematology Method Paper & Diagrams
During the Immunohematology externship students will write a short antibody screen methodology paper. This paper will be uploaded to Canvas once completed. Students will demonstrate understanding of workflow in the blood bank department by completing several workflow diagrams. Please see the syllabus for further information and specific forms to fill out and turn in.

Clinical Competency Checklists
The purpose of the competency checklist is to provide the student and clinical instructor with a list of expectations that describe the level of competency that is required of the student upon completion of a rotation. When this is used every day, as a learning tool, it will give the student an opportunity to work up to the expected level of achievement.

It is the student's responsibility to ensure that the *Clinical Competency Checklist* form is filled out appropriately. **It is best to fill out the checklist as each competency element is completed. Do not wait to the end of rotation!**

The clinical instructor will assign an achievement level for the specific task or skill based on the descriptors for each checklist. The level of expected achievement is highlighted.

If by the end of the rotation, a student fails to meet the level of expected achievement the appropriate faculty member and the clinical coordinator or clinical instructor will determine the next appropriate action.

If there is not agreement on how the issue is to be resolved it will be addressed by the Progress and Promotions Committee.

Final Examinations

Upon the completion of each externship course (except MLS 463 Foundations III) the student will take an online written examination prepared by the MLS program faculty. The clinical site will proctor exams. The externship site coordinator will be emailed a pdf version of the exam / answer sheet that may be printed for the student to use if there are technical difficulties with the online format. Answer sheets only may be emailed, faxed or mailed to the MLS program office. MLS program faculty will grade the exams.

Student Evaluation of Externship
It is the student's responsibility to complete an evaluation for each clinical rotation.
This will be completed *online* at the end of each rotation. Students will access the survey via the individual canvas course shell for each rotation.

STUDENT RESPONSIBILITY QUICK CHECKLIST

The student is responsible for returning the following assignments to the appropriate faculty member (via Canvas) by the due dates listed in the course syllabi. ***Please retain a copy of all submitted paperwork for your files.***

Chemistry/Immunology

√ **when done**

- Completed Chemistry/Immunology Competency Checklist _____
- Student Evaluation of Externship Rotation _____
- Final Externship Exam _____

Hematology/Hemostasis / Urinalysis

- Completed Heme/ Hemostasis / UA Competency Checklist _____
- Student Evaluation of Externship Rotation _____
- Final Externship Exam _____

Microbiology/Serology

- Completed Microbiology/Serology Competency Checklist _____
- Student Evaluation of Externship Rotation _____
- Final Externship Exam _____

Immunohematology

- Completed Immunohematology Competency Checklist _____
- Completed Proficiency Testing Forms (page 2 of forms only) _____
- Antibody Screen Methodology Paper _____
- Diagrams X5 _____
- Student Evaluation of Externship Rotation _____
- Final Externship Exam _____

Foundations of MLS III

- Completed Clinical Experience Documentation Form _____
- Student Evaluation of Externship _____

XIII. DRESS AND APPEARANCE CODE

Guidelines for dress and grooming

Personal appearance is expected to reflect a professional image. Dress and grooming should be appropriate for an individual's duties and meet acceptable standards of taste, cleanliness and safety. Students will comply with established dress code policies for their clinical site and will maintain a level of personal hygiene consistent with the clinical environment.

Policy

A. Each individual is responsible for dressing in a professional and businesslike manner appropriate for his or her assignment. Leisure wear and other distracting extremes in dress and grooming are unacceptable. Students will not wear shorts, sleeveless garments, sandals or open-toed or high-heeled shoes.

B. **Proper laboratory attire** will require clean, white or colored, unwrinkled lab coats (worn over street clothes). Laboratory coats are to be worn only in the laboratory area and should be impervious to blood, body fluids, concentrated acids or other hazardous chemicals. Lab coats must be changed weekly or sooner if contaminated with biological or chemical substance.

C. Fingernails are to be neatly manicured and of length not to exceed 1/4 inch beyond the fingertip and decorations should be safe, functional and customary for the work area. Students will not wear any type of nail enhancement (as recommended by the Centers for Disease Control). This includes but is not limited to the following: artificial nails, acrylics, tips, wraps, appliqués, gels, or any additional items applied to the nail surface with the exception of nail polish. Nail polish should be smooth and not chipped.

D. Each Clinic Site is responsible for the consistent enforcement of dress and grooming requirements.

E. Identification Badges

OIT Student ID badges must be always worn.
OR
Photo identification badges, if supplied by the clinical site, and are considered part of the employee dress requirements.

F. Unique Additional Requirements: Dress and appearance guidelines will be adhered to as directed by each clinical site.

XIV. ACADEMIC STANDARDS

Each rotation of the externship is a separate academic course and is individually graded. Students must receive a passing grade of 75% or higher for all externship rotations courses. OIT · OHSU faculty will determine the grade for each course. Please refer to grading policy for each individual externship course.

Professional Development Evaluation Form (pages 11-13).

Only clinical instructors who have worked with the students a minimum of three days are responsible for filling out a *Professional Development Evaluation Form*. ***Students do not decide who fills out evaluation forms on them. The clinical coordinator, section supervisor or lab manager will determine who evaluates the student.*** The form allows for an overall employment recommendation, comments from the evaluator, a place for the student to sign showing that they have reviewed the evaluation and a student response (optional). ***If a student receives a score of 1 (below expectations) please refer to Failing the Clinical Externship section below for additional information.***

Clinical instructors and / or the clinical coordinator will evaluate the student and assign scores (1, 2, 3 or N/A = Not Observed) for each of the professional attribute areas as listed below:

Knowledge and Skills	Habits and Attitudes
Application of Knowledge	Initiative
Laboratory Performance	Interest
Laboratory Results	Responsibility
Utilization of Time	Interpersonal relations
Organization Skills	Professional Performance
Problem Solving Skills	Integrity
	Cleanliness/Orderliness
	Promptness
	Confidence
	Institutional and Laboratory Policies
	Communication

Failing a Clinical Externship Course

Medical laboratory science students enrolled in the externship courses are required to perform satisfactorily in all clinical rotations as stated in the student handbook. Failing an externship course is defined as one or more of the following:

1. Receiving a final grade of less than 75% in course.
2. Failing the course externship exam with a grade of less than 75%.
3. Failure to meet expected achievement levels on the clinical competency checklist for any course.
4. Score of 1 on the Professional Development Evaluation
    a) If a student scores a 1 in the Knowledge and Skills section it is considered unsatisfactory performance and will be referred to the Progress and Promotions Committee
    b) If a student receives a score of 1 in the Habits and Attitudes section it is considered unsatisfactory performance and may be referred to the Progress and Promotions Committee at the discretion of the program education coordinator, program director and appropriate faculty member

In cases when a student fails an *externship course*, the repeated course shall not exceed the number of weeks, days, or time period regularly scheduled for the externship or the enrichment experience. Additionally, the student will not usually remediate at the clinical site where the unsuccessful attempt was made. Additionally, placement of a remediating student is determined by the MLS Program clinical education coordinator in consultation with faculty and clinical affiliate training site(s) that may be available to host the remediating student.

One universal consequence in all cases of remediation is the prospect of a delay in the student's progress through and the completion of the program, and a postponement of graduation. Nevertheless, when a student must repeat an MLS course as a consequence of remedial action, the student is responsible for all tuition and fees associated with repeating said course, for meeting the University's requirements for course registration, and he or she must meet all University requirements for maintaining active admission status. Should a remediating student be unsuccessful in meeting the terms of the action plan for remediation, the student is dismissed from the program.

Student Action Plan

When a student displays unacceptable technical performance or behavior attitude, a Student Action Plan Form (see pages 25-26) will be completed by the appropriate faculty in consultation with the clinical instructor or clinical coordinator. Corrective actions will be recorded and acknowledged by the appropriate program faculty, the student, the clinical site instructor or coordinator, the program clinical coordinator, and the program director. The completed form will be submitted to the program education coordinator and the MLS program office for placement into the student's file.

OREGON INSTITUTE OF TECHNOLOGY
OREGON HEALTH & SCIENCE UNIVERSITY
Medical Laboratory Science Program

Student Action Plan Form

Student Name: _____ Date: _____

Externship Rotation: _____

Initial Clinical Site: _____

Remediating Clinical Site (if different): _____

SECTION I: Identify the problem (Check all that apply)

- ☐ Academic
  - Failure to pass the course with a grade of 75% or greater
  - Failure to pass the externship written exam with a grade of 75% or greater
    Explain:

- ☐ Non-academic
  - Failure to meet the expected levels on the Clinical Competency Checklist
  - Professional Development Evaluation
    - Student receives a score of 1 for one or more Knowledge and Skills criteria
    - Student receives a score of 1 for one or more Habits and Attitudes criteria
  - Other
    Explain:

SECTION II: Briefly describe the performance expectations relative to the problem(s).

SECTION III: Briefly describe the actions being taken, including the time frame for actions to resolve the problem(s). Identify person(s) responsible for monitoring completion of actions.

I have counseled the student regarding the problem

CLINICAL SITE INSTRUCTOR OR COORDINATOR	**DATE**
MLS FACULTY	**DATE**
PROGRAM CLINICAL COORDINAOR	**DATE**
PROGRAM DIRECTOR	**DATE**
STUDENT SIGNATURE	**DATE**

□ I acknowledge that this corrective plan has been discussed with me.

(Attach any documentation)

MLS 470
Chemistry and Immunology Externship

MLS 470 Chemistry and Immunology Externship Syllabus – Fall 2022

Course Instructor: **Ryan Brown, MS, MLS (ASCP), Assistant Professor**, OIT/OHSU

Office Hours: Monday through Friday 8:00 am – 4:00 pm, my office (Oregon Tech Wilsonville 4th floor, rm. 447) is usually OPEN. I welcome questions and comments in person as well as via email ryan.brown2@oit.edu or phone (503 821-1148). Because of the geographic distance between each externship student and the MLS Program, it is expected that most communications will be conducted electronically or by phone.

Catalog Description: Practical experience at an approved off-campus clinical site emphasizing application of knowledge and skills to perform a wide variety of testing in a contemporary clinical chemistry/immunology laboratory, and further develop discipline-specific competency.

CRN: 10717

Prerequisite Courses: Requires successful and satisfactory completion of all didactic courses in the OIT/OHSU Professional MLS Program, before starting the externship.

Externship Location: Each student will have an assigned externship which is selected by the MLS Program Clinical Coordinator. Each chemistry and immunology externship MLS student will have an assigned clinical laboratory site. In some cases, multiple clinical sites may be used.

Days/ Times/ Location: Established for each student by the program clinical coordinator and clinical externship sites.

Credit Hours: 3 credits

Program Student Learning Outcomes (PSLOs) addressed by Chemistry/ Immunology Externship

The following outcomes are assessed by exam, competencies, and professional development evaluation.

1. Competency to perform a full range of testing in the contemporary medical laboratory encompassing pre-analytical, analytical, and post-analytical components of laboratory services in immunology and clinical chemistry.
2. Proficiency to problem-solve, troubleshoot, and interpret results, and to use statistical approaches when evaluating data.
3. Professional and ethical conduct, respecting the feelings and needs of others, protecting the confidence of patient information, and never allowing personal concerns and biases to interfere with the welfare of patients.
4. Maintaining appropriate composure under stressful conditions.
5. Administrative skills consistent with philosophies of quality assurance, continuous quality improvement
6. Application of safety and governmental regulations and standards as applied to medical laboratory practice.
7. Effective communication skills to ensure accurate and appropriate information transfer.

Chemistry and Immunology Externship Course Objectives

MLS 470 introduces the MLS student to clinical chemistry and immunology service laboratory environments. At the completion of this clinical chemistry and immunology externship the MLS student will be able to:

1. Collect and safely handle biological specimens for analysis.
2. Perform accurate and precise laboratory testing.
3. Evaluate and interpret laboratory test data.
4. Identify problems and take corrective actions.
5. Demonstrate proficiency in quality assurance methods to monitor procedures, instrumentation, ancillary laboratory equipment, and technical competency.
6. Operate laboratory instruments and equipment properly and perform preventative maintenance and repair.
7. Comply with established laboratory and facility safety regulations.
8. Demonstrate effective use of computer systems and laboratory software.
9. Evaluate the efficacy of new procedures and instrumentation for a given setting.
10. Demonstrate ethical behavior and maintain confidentiality in terms of patient results and status.
11. Interact professionally with patients and other personnel.

Required Textbook: Harr, Robert R. (2019). *Medical Laboratory Science Review* (5th ed.).
ISBN-13: 978-0803668270 ISBN-10: 0803668279

Recommended Textbooks:

Bishop, M.L., E.P. Fody, L.E. Schoeff. Clinical Chemistry: Principles, Techniques, and Correlations. 7th ed., Lippincott Williams & Wilkins. 2013. (ISBN: 978-1-4511-1869-8)

Ciulla, A.P & D.C. Lehman. Success in Medical laboratory science. 4th ed. Pearson. 2010 (ISBN 978-0-13-512648-6)

Format:

The Clinical Chemistry and Immunology Externship is predominantly service lab practice and learning based on one-on-one student/teacher mentorship. The student can perform a variety of procedures under the supervision of a certified Medical Laboratory Scientist. The externship advances, utilizes and extends the didactic skills acquired in the preclinical MLS Program. Enhanced psychomotor skills will be developed using state of the art service laboratory instrumentation and ancillary equipment, utilizing Standard Operating Procedures of the training site(s). The MLS student's affective domain skills will be strengthened by daily practice guidance supplied by professional laboratory and non-laboratory staff, as well as patient interaction practice and feedback. Clinical site audiovisual, internet/computer tutorial-assisted learning, library resources and on-site educational meeting attendance may also be employed.

Exam:
One comprehensive exam will be completed on the last day of the Chemistry and Immunology Externship. The on-site clinical coordinator, or an appropriate alternate, will proctor the exam.

Question format will be multiple choice.

Every MLS externship student must take and pass the chemistry and immunology externship exam as one of the requirements to successfully complete the chemistry and immunology externship. The minimum passing score is 75%.

Students not achieving the exam minimum passing score, will be allowed to remediate and will be given a second exam within 7 days from the time the exam grade is received. A student who fails to achieve a grade of 75% or better on the second exam will fail the Chemistry / Immunology externship rotation.

Question complexity will follow the accepted taxonomy of the ASCP as shown below:

- Taxonomy 1 Recall -- Ability to recall or recognize previously learned (memorized) knowledge ranging from specific facts to complete theories.
- Taxonomy 2 Interpretative Skills -- Ability to utilize recalled knowledge to interpret or apply verbal/ numeric/ visual data.
- Taxonomy 3 Problem Solving -- Ability to utilize recalled knowledge and the interpretation of distinct criteria to resolve a problem and/or make an appropriate decision.

Test questions may be at taxonomy levels 1, 2 or 3.

Non-exam, Evaluation Related Requirements of the Clinical Chemistry and Immunology Externship

Due Dates:

The completed competency checklist, professional development evaluation, and the student evaluation of the externship site are all **due by 5pm on the Monday following the completion of the rotation**, except for the final rotation. For this final rotation, all paperwork is **due by Noon on the final day of the rotation, Wednesday, December 7th.** For each item the student is responsible for turning in, **there will be a 1% deduction from the final course grade for every day it is late.**

- **PROFESSIONAL DEVELOPMENT EVALUATION:** Although this form is completed by externship mentors and/or the site clinical coordinator, it is the student's responsibility to ensure that the "Professional Development Evaluation" form is filled out (with appropriate mentor signature/initials) properly and submitted in a timely manner.

- **MLS PROGRAM CLINICAL COMPETENCY FORM:** Completed forms (one each for chemistry and immunology) must be submitted at the completion of the chemistry and immunology externship. Evaluation Rubric and forms are included in this syllabus packet.

- **STUDENT EVALUATION OF EXTERNSHIP:** It is the student's responsibility to complete an evaluation on each clinical chemistry and immunology site and/or instructor(s). It is the student's responsibility to complete the online form. Information regarding the online survey will be emailed to students.

Chemistry and Immunology Externship Grading:
Based on the following evaluation components;

Evaluation Component	Weighted %	Grading Responsibility
Externship Exam (Minimum exam score of 75% required)	75%	OIT/OHSU Program Faculty
Clinical Chem and Immunology Competency:	15%	REQUIRED Submission to OIT/OHSU Program
Student Evaluation of Externship:	10%	REQUIRED Submission to OIT/OHSU Program

Attendance
There is no graded component in the course for attendance, instead students are expected to adhere to the indicated schedule as a demonstration of professional conduct. Students are required to attend externship 40 hours a week on time for the assigned schedule. Students are not required to attend externship during the designated school holidays.

Egregious **tardiness** will not be tolerated at the clinical site and will result in 5% grade reduction per consultation between the clinical site and the MLS instructor.

In the case of anticipated absences, illness, or other emergency **all of the following individuals MUST be contacted to grant approval:** the clinical site's student coordinator, the MLS instructor of the course, and the assigned trainer or lab section assigned to for the day of the expected absence. Should the unexpected absence result in prolonged absence from the externship experience, the instructor for the course will work with the student to develop an action plan for externship completion.

Absences that are not approved by the MLS program and the clinical site will be designated as **unexcused absences and result in a final grade reduction of 10% per day**. Time missed due to an unexcused absence will not be made up.

Grading: Letter grades for registrar submission are based on the cumulative percentages shown below:

GRADE	% RANGE
A	**92-100**
B	**82-91.9**
C	**75-81.9**
D	**60-74.9**
FAIL	**<59.9**

Unsatisfactory Performance:

MLS students enrolled in the chemistry and immunology externship are required to perform satisfactorily. An unsatisfactory grade is defined as one or more of the following:

1. Obtaining less than 75% on the chemistry and immunology externship rotation exam.
2. Receiving an average overall recommendation for employment score of "Not Recommend" on the Professional Development Evaluation form.

3. Receiving a score of "1" in any of the following sections: "Application of Knowledge"; "Laboratory Performance"; "Problem Solving Skills"; and "Institutional and Laboratory Policies".
4. A course grade of less than "C" (75%).

Failure to Pass the Chemistry / Immunology Externship Course

If a student does not pass (less than the overall 75% average, 'C' grade, in the clinical chemistry and clinical immunology externship course) they will be given the opportunity to remediate the deficiencies in performance. The type and length of mediation will be determined on a case-by-case basis by the chemistry/ immunology faculty member. A corrective action plan will be written. (See Student Action Plan pp. 25-26)

The timing of the remediation will be dependent on the clinical site space and availability. This may result in a delay of graduation.

The student must register to repeat the chemistry / immunology externship course.

If a student fails to successfully remediate per the requirement of the corrective action plan, the case will be referred to the program Progress and Promotion Committee for resolution.

Medical Laboratory Science Student Guidelines to Attain Competency in Clinical Chemistry and Clinical Immunology:

The following are guidelines for MLS students enrolled in the Clinical Chemistry and Clinical Immunology Externship.
The supervisor of the clinical service laboratory department will assign your work hours and work area ("bench") for any day or time frame. Students may be assigned to be at more than one area in any given workday.
Clinical Chemistry and Clinical Immunology consists of many distinct areas; therefore, each day's workload is hard to predict. Usually, students will be assigned to an area and work along with a clinical laboratory scientist.

Students perform "hands-on" with instruments and ancillary equipment to include automated chemistry analyzers; automated immunoassay analyzers; electrophoretic systems; fluorescence microscopes; and chromatography systems.

Students observe how interaction occurs among clinical laboratory scientists and other laboratory and non-laboratory professionals.

Students observe and/or perform setting up clinical laboratory specimens for testing and storage.

Students observe and practice select manual clinical analysis methods.

Students work on selected benches with laboratory scientists to understand how a laboratory functions with a typical day's analytic workload.

Students may, if time allows, rotate into other laboratory areas, if the bench mentor(s) deems important for skill acquisition connected to primary bench area function.

Clinical Chemistry and Immunology Competencies

During and after completing the clinical chemistry and clinical immunology externship the MLS student will demonstrate the following competencies:

1. Knowledge of procedures and/or instrument principles by:
   Verbally answering questions about principles of procedure and procedural notes.
   Being aware of stopping places in procedure.
   Being able to explain techniques required.
   Explaining storage and use of reagents.
   Being able to set up and perform routine analytic runs, stat runs, and runs using unusual samples (ex. alternative fluids or diluted or concentrated samples.
2. Ability to apply principles of troubleshooting and corrective action by systematically evaluating techniques, procedures used, reagents, standards, glassware/plastics, and any other applicable condition.
3. Troubleshoot instrument problems by reporting to and consulting with bench supervisor; analyzing data generated by instruments; and referring to and interpreting instrument manuals.
4. Knowledge of instrument maintenance by reading maintenance section of instrument manuals.
5. Verbally answering questions about routine maintenance procedures; and performance of routine maintenance (standard operating procedures based on preparing instruments for maintenance, selection of appropriate materials, application of correct technique, record maintenance in appropriate written and/or electronic format).
6. Ability to produce and utilize quality control data by determining acceptability of control values; construction and utilization of Levey-Jennings control charts in association with Westgard Multi-rule System; and examination of quality control data for indications of trends, shifts, over- or under-control test values.
7. Ability to correlate chemical and immunological data with disease processes and with other laboratory data.
8. Use correctly, to the satisfaction of the clinical instructor, equipment to include centrifuges; rotators and mixers; automated sample aliquoting instruments; concentration devices; photometric instruments (ex. spectrophotometers, fluorometers, chemiluminometry, nephelometers/turbidimeters); scanning devices; electrochemical analyzers
   (ISE electrodes, chloridometers, pH meters); osmometers; automated chemistry analyzers; automated immunoanalyzers; robotic systems for sample preparation/dilution/distribution; electrophoresis equipment; chromatography systems (ex. HPLC, GC, TLC, Mass Spectrometry); laboratory computer systems and software; bar code readers; safety equipment; and POCT instruments.
9. Identify and design solutions for problems associated with discrepancies in test results by explaining how the different solutions should be handled (whether a student deals with each situation in an appropriate manner is determined by the bench instructor or externship site clinical coordinator.
10. Exam each testing method for accuracy and precision outcomes based on acceptability of laboratory data according to accuracy and precision parameters; validity of a given set of laboratory data according to correlative criteria; evaluate performance data between two laboratory methods for the same determination; and judge acceptability of a laboratory determination according to appropriate visual criteria (ex. potential interferents).
11. Communicate effectively as indicated by:
    - Effectively communicating results, sample requirements, inappropriate sample problems, and collection procedures with non-laboratory health care providers (ex. attending physicians, nursing staff)
    - Effectively communicating within the laboratory departments with laboratorians, pathologists, and support staff.

- Effectively communicating with non-patient interactive departments (ex. human resources, accounting and billing, marketing, and pharmacy).

12. Abide by Health Insurance Portability and Accountability Act (HIPAA) regulations, and describe reasons for keeping patient, laboratory, and hospital information confidential.
13. Operational work habits that follow Federal, State, and institutional safety guidelines which includes
    Correct collection, handling, storage, shipping, and disposal of biological samples, and chemical and radioactive reagents.
    Knowledge of guidelines for reporting work related accidents with the externship institution
    Knowledge of laboratory safety, emergency conditions, and chemical hygiene plan (including Material Safety Data Sheet access), utilized by the externship institution.
    Correct use of personal protective equipment and safety equipment and reagents (ex. biological safety cabinets, chemical safety hoods, special respiratory apparatus, and chemical spill reagents).

Chemistry / Immunology Externship Exam:

Exam questions will come from the following text: Harr, Robert R. (2019). *Medical Laboratory Science Review* (5th ed.). ISBN-13: 978-0803668270 ISBN-10: 0803668279

Exam questions will be selected from the following chapters: Chapters 3 and 4.
The closed book, closed notes, no computer, chemistry/immunology externship exam will use a multiple-choice format.

A calculator may be used. The number of questions will be between 75 – 100. Except under either extenuating circumstances or time considerations, the exam will be conducted on the last day of the 4-week chemistry and immunology externship. Either the externship site coordinator, or a designated laboratorian, will proctor the exam.

Additional study guides and computer-assisted resources can useful for additional study, but the externship exam itself will only utilize material reviewed in the Harr, Robert R. (2019). *Medical Laboratory Science Review* (5th ed.). ISBN-13: 978-0803668270 ISBN-10: 0803668279

Examples of these supplemental resources are shown below:

Tanabe, P.A., & E.B. Holladay. BOR Study Guide Clinical Laboratory Certification Examinations. 5th ed. American Society for Clinical Pathology. 2009. (ISBN 978-0-8918-9587-9)

MediaLab Online practice mock exams at: www.medialabinc.net/lms/student/st_login.aspx?brandid=2
Each MLS student has an assigned login username and password.

NOTE: There is no guarantee or suggestion that the questions in these study guides and computer mock exams will be part of any certification exam [including the ASCP(BOC) MLS exam]. These resources are for your benefit as a study and practice guide for chemistry and immunology, as are applicable in clinical laboratory service lab settings**.**

GOOD LUCK! STUDY HARD! STUDY OFTEN! APPLY THE INFORMATION!

Chemistry Laboratory Clinical Experience

Students will work with their clinical instructor(s) to complete the listed competencies. Accuracy, precision, timely reporting of results and demeanor must comply with the laboratory's acceptable standards. While working in the laboratory, the student must meet laboratory standards for work habit skills in patient confidentiality, communication skills laboratory safety, universal precautions, waste disposal, equipment, and work area maintenance.

Upon completion of the Chemistry rotation, the student will have successfully completed the following:

1. Correctly performs testing with the analyzers routinely used in the laboratory for chemistry. This will include correctly troubleshooting analyzer performance problems, and also evaluating patient test results for critical values, short-sampling errors, and inappropriate specimens. The student will change or replace reagents / disposables as needed by the analyzer(s).
2. Correctly performs or assists in performing Daily and Weekly Preventative Maintenance of the chemistry equipment routinely used in the laboratory.
3. Accurately summarizes the calibration procedures for any chemistry analyzers used in the laboratory.
4. Correctly performs Daily/Shift QC procedures on the analyzers or test methods used. The student will learn the laboratory's SOP for resolving QC discrepancies, and then correctly apply those procedures, including all required documentation activities.
5. Correctly performs, or assists in performing, routine testing (as deemed appropriate for students by the clinical facility) in chemistry.
6. Accurately reports test results (STATS, critical values, etc.) by telephone to a nurse, physician or other appropriate health care professional, according to the SOP used by the laboratory (as deemed appropriate for students by the clinical facility).

Chemistry Competency Levels of Achievement

Directions:

To document the mastery of a competency, the clinical instructor must select the level of achievement attained by the student. See competency levels and descriptors below.

Select the mastery level achieved that most closely corresponds to the descriptors and initial the appropriate lines. If the competency is not initialed, it is assumed that the competency is not completed.

The Minimum Expected Achievement competency for each action item is highlighted and the student can achieve a higher competency than the established minimum. Students should achieve a score at or above that level. It is requested that the student's laboratory competency evaluation be completed by the clinical instructor ***in the presence of the student at the end of each shift*** to allow verbal feedback to the student regarding the student's progress and performance.

It is the responsibility of the student to ensure that the Clinical Competency form is filled out appropriately and submitted to the appropriate MLS faculty. When this is used every day as a learning tool it will give the student an opportunity to progress to the expected level of achievement.

LEVEL 1: Discussed: Process was discussed, principle explained, student acknowledges an understanding of the process or principle.

LEVEL 2: Demonstrated/Observed: Process has been performed and demonstrated by the clinical instructor and was observed by the student.

LEVEL 3: Practiced: Student has ***practiced*** the process under the direction and maximum supervision of the clinical instructor.

LEVEL 4: Performed: The student has performed the process satisfactorily under minimal supervision.

N/A: Not applicable / not performed or not observed: The nature of the laboratory does not allow the student access to the equipment/test method described.

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Clinical Chemistry Competency Checklist

Student Name: _____ **Rotation Dates:** _____

Externship Site: _____

Directions: Enter date/evaluator initials at level that the competency element was performed.
Students may progress to any level depending on laboratory test menu.

Scoring Scale

Discussed: process/procedure was discussed, principle explained, student acknowledges an understanding of the process or principle.
Demonstrated/Observed: process/procedure was demonstrated by the clinal instructor and observed by student.
Practiced: process/procedure has been practiced by student under the direction and maximum supervision of the clinical instructor.
Performed: process/procedure performed successfully under minimal supervision.
Use 'N/A' in cases where no training opportunities are available, or procedures are not done in this lab

COMPETENCY ELEMENT	Discussed	Observed	Practiced	Performed
Main Automated Chemistry Analyzer (_____) Can accurately and precisely perform, or discuss, the following:				
Read Procedure and Operations Manual				
Summary of Each Analyte's Measurement Principle -- *List of Analytes on this Analyzer to be Submitted by Student at Completion of Chemistry Rotation*				
Proper Preparation/Use/Status of Controls/Calibrators/Standards/Reagents				
Perform and Program Runs/Reruns/Special Sample Considerations/Criteria for Repeating Tests/Runs				
Loading/Unloading Reagents/Patient Samples/Controls/Calibrators				
Recognition and Use of Appropriate Testing Samples (Whole Blood/Serum/Plasma/Urine/CSF/Other, and Appropriate Anticoagulant Usage)				
Perform and Program STAT samples				
Calculate, Perform and Program Sample Dilutions				
Perform QC/QA for Individual Analytes to Include: Control(s) Acceptance/Patient Critical Values/Patient Delta Checks				
Report Patient Results Accurately and in a Timely Manner				
Down Time and Backup Procedures				
Documentation and Corrective Action for Common Failures to Include: Temperature Controls, Sample Probes/Lines, Reagent Probes/Lines, ISE Electrodes, Detectors (ex. Spectrophotometer), Sample Interferents (Lipemic/Hemolyzed/Icteric/Others).				
Daily/Weekly/Monthly/Quarterly Maintenance Recording Procedures				

COMPETENCY ELEMENT	Discussed	Observed	Practiced	Performed
Blood Gas Analyzer – If Performed in Chemistry (_____) Can accurately and precisely perform, or discuss, the following:				
Theory of Operation/Electrodes				
Recognition and Use of Appropriate Testing Sample Type/Conditions/Time Limitation				
QC/QA Performance, Routine Maintenance, and Record Keeping, and Documentation of Corrective Actions				
Proper Preparation and Use of Controls/Calibrators				
Report Patient Results Accurately and in a Timely Manner				
Automated/Manual Electrophoresis – If Performed in Chemistry Can accurately and precisely perform, or discuss, the following: *Circle Type(s): IEP, IFE, Western Blot, Enzyme, Isoenzyme, SPE, Lipoprotein, Hemoglobin*				
Automated/Manual Electrophoresis – If Performed in Chemistry				
Can accurately and precisely perform, or discuss, the following:				
*Circle Type(s): IEP, IFE, Western Blot, Enzyme, Isoenzyme, SPE, Lipoprotein,				
Hemoglobin*				
Automated/Manual Electrophoresis – If Performed in Chemistry				
Osmometry Instrument – If Performed in Chemistry Can accurately and precisely perform, or discuss, the following: *Circle Type: Freezing Point Depression, Dew Point Depression*				
Theory of Operation to Include: Appropriate Chamber Conditions, Thermistor Requirements, and Colligative Properties Principles and mOsmol/Kg				
Recognition and Use of Appropriate Testing Sample Type/Conditions to Include: Serum/Plasma/Urine/CSF/other Body Fluids.				
QC/QA Performance, Routine Maintenance, and Record Keeping, and Documentation of Corrective Actions				
Proper Preparation and Use of Controls/Calibrators				
Report Patient Results Accurately and in a Timely Manner				
Theory of Operation to Include: Appropriate Chamber Conditions, Thermistor Requirements, and Colligative Properties Principles and mOsmol/Kg				
Laboratory Safety – strictly adheres to or accurately summarizes the following:				
The Universal Precautions Policy of the Facility to Include Safety Manuals, Disaster Manuals, Personnel Protective Equipment, and Incident Reporting				
Knowledge of Safety shower, Eyewash Station and All Other Lab Safety Equipment, and Abides by Hand Washing and Lab Coat Storage/Washing				
Demonstrates proper disposal technique of biohazard & chemical materials				

COMPETENCY ELEMENT	Discussed	Observed	Practiced	Performed
Chromatography Systems – If Performed in Chemistry Can accurately and precisely perform, or discuss, the following: *Circle Type: GC, GC-MS, HPLC, HPLC-MS, Tandem MS, TLC*				
Theory of Operation to Include: Mobile and Solid Phase Chemistry, Column Types, Buffer Conditions, Temperature Considerations, Mobile Phase Flow Rates, Sample Derivatization Chemistry if Needed, Extraction/Concentration of Sample if Needed, and Detection Systems				
Recognition and Use of Appropriate Testing Sample Type/Conditions to Include: Serum/Plasma/Urine/CSF/other Body Fluids.				
QC/QA Performance, Routine Maintenance, and Record Keeping, and Documentation of Corrective Actions				
Proper Preparation and Use of Controls/Calibrators				
Report Patient Results Accurately and in a Timely Manner				
Atomic Absorption Spectrophotometry – If Performed in Chemistry Can accurately and precisely perform, or discuss, the following:				
Theory of Operation to Include: Spectrophometric Theory, Hollow Cathode Lamp Types and Usage, Furnace Type, and PMT Detection System				
Recognition and Use of Appropriate Testing Sample Type/Conditions to Include: Blood/Urine/CSF/other Body Fluids, and Metal-Free Collection				
QC/QA Performance, Routine Maintenance, and Record Keeping, and Documentation of Corrective Actions				
Proper Preparation and Use of Controls/Calibrators				
Report Patient Results Accurately and in a Timely Manner				
Forensic Toxicology Systems -- If Performed in Chemistry Can accurately and precisely perform, or discuss, the following:				
Theory of Operation to Include: Instrumentation, and Readout Devices				
Recognition and Use of Appropriate Testing Sample Type/Conditions to Include: Serum/Plasma/Urine/CSF/other Body Fluids, legal documentation and paper trail, legal considerations, and handling and storage				
QC/QA Performance, Routine Maintenance, and Record Keeping, and Documentation of Corrective Actions				
Proper Preparation and Use of Controls/Calibrators				
'Mock' Reporting of Patient Results Accurately and in a Timely Manner; *Include a list of analytes tested/discussed, and Indicate if Screening, Qualitative, or Quantitative*				

COMPETENCY ELEMENT	Discussed	Observed	Practiced	Performed
Point of Care Procedures and/or Miscellaneous Manual Tests -- If performed in Chemistry Can accurately and precisely perform, or discuss, the following: *(please supply list per Point of Care, and per Manual Procedures*				
Theory of Operation to Include: Instrumentation Theory, Readout Devices, and ancillary equipment				
Recognition and Use of Appropriate Testing Sample Type/Conditions to Include: Serum/Plasma/Urine/CSF/other Body Fluids.				
QC/QA Performance, Routine Maintenance, and Record Keeping, and Documentation of Corrective Actions				
Proper Preparation and Use of Controls/Calibrators, including any for POC any Electronic Controls				
Report Patient Results Accurately and in a Timely Manner				
Laboratory Safety – strictly adheres to or accurately summarizes the following:				
The Universal Precautions Policy of the Facility to Include Safety Manuals, Disaster Manuals, Personnel Protective Equipment, and Incident Reporting				
Knowledge of Safety shower, Eyewash Station and All Other Lab Safety Equipment, and Abides by Hand Washing and Lab Coat Storage/Washing				
Demonstrates proper disposal technique of biohazard & chemical materials				

Evaluator's Comments

Student's Comments

_____

Evaluator's Signature/ Date

_____

Student Signature/ Date

□ **This Competency evaluation has been reviewed with me.**

(Please place student comments on reverse if needed.

Upon completing competency form, review with student. The clinical site should retain a copy for their files and the student is to return form by **upload to canvas**, email, fax or mail to Ryan Brown**.**

Upload to Canvas (preferred)

Address: OHSU•OIT MLS Program
27500 SW Parkway Ave
Attn: Ryan Brown
Wilsonville, OR 97070

Email: ryan.brown2@oit.edu
FAX # 503-218-1126
(Be sure to fax both sides of double-sided forms)
Questions: Email or call 503-821-1148 (VM)

Immunology Laboratory Clinical Experience

Students will work with their clinical instructor(s) to complete the listed competencies. Accuracy, precision, timely reporting of results and demeanor must comply with the laboratory's acceptable standards. While working in the laboratory, the student must meet laboratory standards for work habit skills in patient confidentiality, communication skills laboratory safety, universal precautions, waste disposal, equipment, and work area maintenance.

Upon completion of the Immunology rotation, the student will have successfully completed the following:

1. Correctly performs testing with the analyzers routinely used in the laboratory for immunology. This will include correctly troubleshooting analyzer performance problems, and evaluating patient test results for critical values, short-sampling errors, and inappropriate specimens. The student will change or replace reagents / disposables as needed by the analyzer(s)

2. Correctly performs or assists in performing Daily and Weekly Preventative Maintenance of the chemistry equipment routinely used in the laboratory.

3. Accurately summarizes the calibration procedures for any chemistry analyzers used in the laboratory.

4. Correctly performs Daily/Shift QC procedures on the analyzers or test methods used. The student will learn the laboratory's SOP for resolving QC discrepancies, and then correctly apply those procedures, including all required documentation activities.

5. Correctly performs, or assists in performing, routine testing (as deemed appropriate for students by the clinical facility) in chemistry.

6. Accurately reports test results (STATS, critical values, etc.) by telephone to a nurse, physician or other appropriate health care professional, according to the SOP used by the laboratory (as deemed appropriate for students by the clinical facility).

Immunology Competency Levels of Achievement

Directions:

To document the mastery of a competency, the clinical instructor must select the level of achievement attained by the student. See competency levels and descriptors below.

Select the mastery level achieved that most closely corresponds to the descriptors and initial the appropriate lines. If the competency is not initialed, it is assumed that the competency is not completed.

The Minimum Expected Achievement competency for each action item is highlighted and the student can achieve a higher competency than the established minimum. Students should achieve a score at or above that level. It is requested that the student's laboratory competency evaluation be completed by the clinical instructor ***in the presence of the student at the end of each shift*** to allow verbal feedback to the student regarding the student's progress and performance.

It is the responsibility of the student to ensure that the Clinical Competency form is filled out appropriately and submitted to the appropriate MLS faculty. When this is used every day as a learning tool it will give the student an opportunity to progress to the expected level of achievement.

LEVEL 1: Discussed: Process was discussed, principle explained, student acknowledges an understanding of the process or principle.

LEVEL 2: Demonstrated/Observed: Process has been performed and demonstrated by the clinical instructor and was observed by the student.

LEVEL 3: Practiced: Student has ***practiced*** the process under the direction and maximum supervision of the clinical instructor.

LEVEL 4: Performed: The student has performed the process satisfactorily under minimal supervision.

N/A: Not applicable / not performed or not observed: The nature of the laboratory does not allow the student access to the equipment/test method described.

Clinical Immunology Competency Checklist

Student Name: _____ **Rotation Dates:** _____

Externship Site: _____

Directions: Enter date/evaluator initials at level that the competency element was performed.
Students may progress to any level depending on laboratory test menu.

Scoring Scale

Discussed: process/procedure was discussed, principle explained, student acknowledges an understanding of the process or principle.
Demonstrated/Observed: process/procedure was demonstrated by the clinal instructor and observed by student.
Practiced: process/procedure has been practiced by student under the direction and maximum supervision of the clinical instructor.
Performed: process/procedure performed successfully under minimal supervision.
Use 'N/A' in cases where no training opportunities are available, or procedures are not done in this lab

COMPETENCY ELEMENT	Discussed	Observed	Practiced	Performed
Main Automated Immunology Analyzer (_____) Can accurately and precisely perform, or discuss, the following:				
Read Procedure and Operations Manual				
Summary of Each Analyte's Measurement Principle -- *List of Analytes on this Analyzer to be Submitted by Student at Completion of Chemistry Rotation*				
Proper Preparation/Use/Status of Controls/Calibrators/Standards/Reagents				
Perform and Program Runs/Reruns/Special Sample Considerations/Criteria for Repeating Tests/Runs				
Loading/Unloading Reagents/Patient Samples/Controls/Calibrators				
Recognition and Use of Appropriate Testing Samples (Whole Blood/Serum/Plasma/Urine/CSF/Other, and Appropriate Anticoagulant Usage)				
Perform and Program STAT samples				
Calculate, Perform and Program Sample Dilutions				
Perform QC/QA for Individual Analytes to Include: Control(s) Acceptance/Patient Critical Values/Patient Delta Checks				
Report Patient Results Accurately and in a Timely Manner				
Down Time and Backup Procedures				
Documentation and Corrective Action for Common Failures to Include: Temperature Controls, Sample Probes/Lines, Reagent Probes/Lines, ISE Electrodes, Detectors (ex. Spectrophotometer), Sample Interferents (Lipemic/Hemolyzed/Icteric/Others).				
Daily/Weekly/Monthly/Quarterly Maintenance Recording Procedures				

COMPETENCY ELEMENT	Discussed	Observed	Practiced	Performed
Functional Immunodeficiency Assays Can accurately and precisely perform, or discuss, the following: *Circle type(s): Complement, Phagocytic, Mitogenic, Cytotoxic, Proliferation, Skin Tests*				
Theory of Assays and Interpretation of Results				
Recognition and Use of Appropriate Testing Sample Type/Conditions/Time Limitation				
QC/QA Performance, Routine Maintenance, and Record Keeping, and Documentation of Corrective Actions				
Proper Preparation and Use of Controls/Calibrators				
Report Patient Results Accurately and in a Timely Manner				
Automated/Manual Immunoelectrophoresis – If Performed in Immunology Can accurately and precisely perform, or discuss, the following: *Circle Type(s): IEP, IFE, Western Blot*				
Theory of Operation to Include: Electrophoresis Power Source, Staining Unit, Fixation Unit/Electrophoresis Chamber/Densitometric or Computer Scanning Readout				
Recognition and Use of Appropriate Testing Sample Type/Conditions/Time Limitation				
QC/QA Performance, Routine Maintenance, and Record Keeping, and Documentation of Corrective Actions				
Proper Preparation and Use of Controls/Calibrators, and Monoclonal/Polyclonal Reagents (with Appropriate Dilutions)				
Report Patient Results Accurately and in a Timely Manner				
Review of Immunoelectrophoretic Scans (Qualitative and/or Quantitative)				
Fluorescence Microscopy – If Performed in Immunology Can accurately and precisely perform, or discuss, the following: *Circle Type: Direct and/or Indirect ANA, ANCA, ASM, Infectious Agents, and others (___)*				
Theory of Fluorescence Microscopy				
Recognition and Use of Appropriate Testing Sample Type/Conditions to Include: Serum/Plasma/Urine/CSF/other Body Fluids (with Appropriate Dilutions)				
QC/QA Performance, Routine Maintenance, and Record Keeping, and Documentation of Corrective Actions				
Proper Preparation and Use of Controls/Calibrators, and Monoclonal/Polyclonal Fluor Reagents (with Appropriate Dilutions)				
Interpretation of Fluorescence Patterns (including Titer Determination)				
Report Patient Results Accurately and in a Timely Manner				

COMPETENCY ELEMENT	Discussed	Observed	Practiced	Performed
Molecular Methods – If Performed in Immunology Can accurately and precisely perform, or discuss, the following: *Circle Type(s): PCR, , B-DNA, RFLP, HLA Transplantation, Tumor Marker, Viral Load, other (____)*				
Theory of Target DNA/RNA Amplification and/or Signal Amplification				
Recognition and Use of Appropriate Testing Sample Type/Conditions to Include: Serum/Plasma/Urine/CSF/other Body Fluids.				
QC/QA Performance, Routine Maintenance, and Record Keeping, and Documentation of Corrective Actions.				
Sample Preparation and Conditions to Eliminate DNA/RNA Contamination				
Report Patient Results Accurately and in a Timely Manner				
Manual Serological Methods – If Performed in Immunology Can accurately and precisely perform, or discuss, the following: Circle Type(s): Agglutination, Complement Fixation, EIA, FIA, RID, Lateral Flow Immunoassay Cassette, other (_____) *				
Theory of Reactions				
Recognition and Use of Appropriate Testing Sample Type/Conditions to Include: Blood/Urine/CSF/Body Fluids, and other (_____)				
QC/QA Performance, Routine Maintenance, and Record Keeping, and Documentation of Corrective Actions				
Proper Preparation and Use of Reagents/Controls/Calibrators				
Report Patient Results Accurately (Quantitative and Qualitative), and in a Timely Manner				
Forensic Toxicology Systems -- If Performed in Chemistry Can accurately and precisely perform, or discuss, the following:				
Theory of Operation to Include: Instrumentation, and Readout Devices				
Recognition and Use of Appropriate Testing Sample Type/Conditions to Include: Serum/Plasma/Urine/CSF/other Body Fluids, legal documentation and paper trail, legal considerations, and handling and storage				
QC/QA Performance, Routine Maintenance, and Record Keeping, and Documentation of Corrective Actions				
Proper Preparation and Use of Controls/Calibrators				
'Mock' Reporting of Patient Results Accurately and in a Timely Manner; *Include a list of analytes tested/discussed, and Indicate if Screening, Qualitative, or Quantitative*				

Laboratory Safety – strictly adheres to or accurately summarizes the following:				
The Universal Precautions Policy of the Facility to Include Safety Manuals, Disaster Manuals, Personnel Protective Equipment, and Incident Reporting				
Knowledge of Safety shower, Eyewash Station and All Other Lab Safety Equipment, and Abides by Hand Washing and Lab Coat Storage/Washing				
Demonstrates proper disposal technique of biohazard & chemical materials				

Evaluator's Comments

Evaluator's Comments

_____

Evaluator's Signature/ Date

_____

Student Signature/ Date

□ **This Competency evaluation has been reviewed with me.**

(Please place student comments on reverse if needed.

Upon completing competency form, review with student. The clinical site should retain a copy for their files and the student is to return form by **upload to canvas**, email, fax or mail to Ryan Brown**.** ***Upload to Canvas (preferred)***

Address: OHSU•OIT MLS Program
27500 SW Parkway Ave
Attn: Ryan Brown
Wilsonville, OR 97070

Email: ryan.brown2@oit.edu
FAX # 503-218-1126
(Be sure to fax both sides of double-sided forms)
Questions: Email or call 503-821-1148 (VM)

MLS 471
Hematology / Hemostasis / Urinalysis Externship

MLS 471 Hematology Externship Syllabus - Fall 2022

Program Faculty: **Dawn Taylor, EdM, MLS(ASCP)**
Associate Professor
Work Phone: (503)821-1157
Email: dawn.taylor@oit.edu

Office Hours: Room 448 Fall term I will be in lecture Mondays and Tuesdays 12:15- 2:05 pm. I will be in lab all day on Wednesdays and Thursdays. I may be away on clinical site visits on some of the days that I am not in class, so it may be best to email me, leave me a phone message or arrange specific appointment times.

Course Description: Practical experience at an approved off-campus clinical site emphasizing application of knowledge and skills to perform a wide variety of testing in a contemporary clinical hematology laboratory and further develop discipline-specific competency. This course includes the areas of hematology, hemostasis, urinalysis and body fluids.

CRN: 10718

Prerequisites: Successful completion of all didactic and pre-clinical coursework in the MLS program.

Days/ Times/ Location: Established for each student by the program clinical coordinator and clinical externship sites.

Prerequisites: Successful completion of all didactic, pre-clinical coursework in the MLS program

Class credit: 3 credits

Instruction: Instructional methods will include independent reading/ study assignments and clinical experience. Students will work with their clinical instructor(s) to complete the listed competencies. Accuracy, precision, timely reporting of results and demeanor must comply with the laboratory's acceptable standards. While working in the laboratory, the student must meet laboratory standards for work habit skills in patient confidentiality, communication skills laboratory safety, universal precautions, waste disposal, equipment, and work area maintenance.

Required Textbook: Harr, Robert R. (2019). *Medical Laboratory Science Review* (5th ed.).
ISBN-13: 978-0803668270 ISBN-10: 0803668279

Resources posted on Canvas:

- The course Hematology syllabus and Competency Checklist will be posted on Canvas.
- There are a set of study questions posted in the course materials section that are designed to guide you through the principles of operation and problem solving utilized in the Hematology/Urinalysis Externship. You are **NOT** required to complete these as part of your grade, but you may find them helpful questions to consider during your rotation.

There are two Laboratory Medicine articles posted in the course materials section. The articles are from 1999, but many of the principles are still applicable today. I would review them before you start your time using the hematology analyzer.

Program Student Learning Outcomes (PSLOs) addressed by Hematology/Hemostasis /UA Externship

The following outcomes are assessed by exam, competencies, and professional development evaluation.

1. Competency to perform a full range of testing in the contemporary medical laboratory encompassing pre-analytical, analytical, and post-analytical components of laboratory services in hematology, hemostasis and urinalysis.
2. Proficiency to problem-solve, troubleshoot, and interpret results, and to use statistical approaches when evaluating data.
3. Professional and ethical conduct, respecting the feelings and needs of others, protecting the confidence of patient information, and never allowing personal concerns and biases to interfere with the welfare of patients.
4. Maintaining appropriate composure under stressful conditions.
5. Administrative skills consistent with philosophies of quality assurance, continuous quality improvement
6. Application of safety and governmental regulations and standards as applied to medical laboratory practice.
7. Effective communication skills to ensure accurate and appropriate information transfer.

Course Objectives:

I. **Specific Skills**: The student will demonstrate the following skills.
   - A. Demonstrate the ability to organize and complete a laboratory workload.
   - B. Demonstrate knowledge of procedure and/or instrument principles by:
     1. Verbally answering questions about principles of procedure
     2. Being aware of acceptable stopping places in procedure.
     3. Being able to explain techniques required.
     4. Explaining correct storage and use of reagents.
   - C. Demonstrate ability to apply principles of troubleshooting:
     1. Troubleshoot and attempt to correct procedural problems by systematically evaluating:
        a. sample
        b. technique
        c. procedure used
        d. reagents / standards
        e. any other applicable condition
     2. Troubleshoot instrument problems by:
        a. analyzing instrument data
        b. referring to the instrument manual
        c. reporting to and consulting with technologist or supervisor
   - D. Demonstrate knowledge of instrument maintenance:
     1. Verbally answer questions about routine maintenance procedures.
     2. Perform routine maintenance procedures correctly:
     3. Prepare instrument for maintenance

4. Select appropriate materials
5. Record maintenance in appropriate record book

E. Demonstrate ability to generate and utilize quality control data by:
   1. Determining acceptability of control values
   2. Inspecting quality control charts for shifts and trends.

F. Demonstrate ability to correlate data with disease process and with other laboratory determinations:
   1. Evaluating validity of a given set of laboratory data according to correlative criteria.

G. Demonstrate the ability to properly use the following equipment (if available), to the satisfaction of the instructor:
   1. Centrifuges
   2. Rotators & mixers
   3. Automated Slide Strainers
   4. Microscopes
   5. Automated Hematology Analyzer
   6. Automated Coagulation Analyzer
   7. Automated Urine Analyzer
   8. Refractometer
   9. Robotics for sample preparation, dilution and distribution (if applicable)
   10. Bar code readers
   11. Laboratory Information System
   12. Safety Equipment

H. Demonstrate ability to solve problems associated with discrepancies in test results by explaining how the different situations should be handled. Whether or not a student deals with each situation in an intelligent manner is at the discretion of the supervisor.

I. Demonstrate an ability to evaluate accuracy and precision of methods used and make judgments accordingly:
   1. Evaluate the acceptability of laboratory data according to accuracy and precision.
   2. Evaluate the validity of a given set of laboratory data according to correlative criteria.
   3. Compare and evaluate performance data between two laboratory methods for the same determination.
   4. Judge the acceptability of a laboratory determination according to appropriate criteria.

II. **Affective domain** objectives that pertain to the clinical externship are noted in the Goals, Objectives and Competencies section (p.14) of the MLS Externship Handbook.

Academic Integrity:

The topic of academic integrity and cheating has been thoroughly covered in the MLS student handbook. Please be aware that all policies and protocols outlined therein are in full effect. A charge of cheating can have severe consequences.

Grades:

- **Final Externship Exam 70%**
  The theoretical aspects of this course will be assessed by the final exam.
  Students must receive a score of at least 75% on the exam to pass the externship.
  Exam questions come from the required textbook**:** Harr, Robert R. (2019). *Medical Laboratory Science Review* (5th ed.) ISBN-13: 978-0803668270 ISBN-10: 0803668279

  A calculator (other than on a phone) may be used.

  Exam questions will be selected from the following chapters: Chapters 1, 2 and 7.

  - If the clinical site has the capability, the student will take this exam online by logging into their Canvas account. The exam MUST be taken at the clinical site on the final day of your rotation unless other arrangements are made with MLS program faculty.
  - The online exam is timed for 3 ½ hours. Once the exam is started, it must be finished. The date and time you take the exam is recorded.
  - ***DO NOT OPEN THE EXAM BEFORE YOU ARE SCHEDULED TO TAKE IT; YOU WILL BE FORCED TO COMPLETE IT.***
  - *Questions may have different wording, answers, or order of answers.*
  - If there are technical difficulties while taking the exam, the clinical site will have a paper copy available.
  - No repeat of this exam will be given.

- **Media Lab WBC Differential Simulator 10%**
  This will be done during the 2-week SIM Lab session before externship rotations start. **This must be completed by Friday, September 2nd.** You will perform 25 expert-reviewed differentials (WBCs only), each with 100 slide images. Perform the differential yourself and then compare your cell identifications with the experts. Cells include segmented neutrophils, lymphocytes, monocytes, blasts, myelocytes, band neutrophils, nucleated red blood cells, eosinophils, metamyelocytes, basophils, reactive lymphocytes, and promyelocytes. At the conclusion of each case, you'll get access to a video summary. Experts from the LSU Health Science Center review each slide in the case, pointing out important morphological features, and working through trickier identifications. Each video lasts 5 – 10 minutes. You will be required to get an overall average grade of at least 82% for all the differentials. If you would like me to reset a case so that you can repeat it, you will need to email that request to me.

- **Media Lab Body Fluid Differential Simulator 5%**
  This will be done during the 2-week SIM Lab session before externship rotations start. **This must be completed by Friday, September 2nd.** You will perform 30 expert-reviewed body fluid analysis that includes color/appearance, hemocytometer count/ calculation and differentiation of cells on cytospin prep. For each case, perform the analysis. At the conclusion of each case, you'll get access to three video summaries. Experts from the LSU Health Science Center review the case, pointing out important aspects of that case. You will be required to complete all of the cases. No minimum grade is required for these exercises as they are designed strictly as a learning exercise to give you more experience with body fluid analysis.

- **Student Evaluation of the Externship 5%**
  It is the student's responsibility to complete an evaluation of the externship. This will be done via an online survey.

- **Student Competency Checklist 10%**
  It is the student's responsibility to make sure that the competency checklist for Hematology/ Hemostasis/ Urinalysis is filled out appropriately and submitted to the MLS faculty.

Grading Scale:

92.0 – 100%	A
82.0 – 91.9%	B
75.0 – 81.9%	C
60.0 – 74.9%	D
Less than 60.0%	F

Due Dates:

The completed competency checklist, professional development evaluation, and the student evaluation of the externship site are all **due by 5pm on the Monday following the completion of the rotation**, except for the final rotation. For this final rotation, all paperwork is **due by Noon on the final day of the rotation, Wednesday, December 7th.** For each item the student is responsible for turning in, **there will be a 1% deduction from the final course grade for every day it is late.**

All items may be submitted should submitted via Canvas or emailed as a last resort.

Attendance

There is no graded component in the course for attendance, instead students are expected to adhere to the indicated schedule as a demonstration of professional conduct. Students are required to attend externship 40 hours a week on time for the assigned schedule. Students are not required to attend externship during the designated school holidays.

Egregious **tardiness** will not be tolerated at the clinical site and will result in 5% grade reduction per consultation between the clinical site and the MLS instructor.

In the case of anticipated absences, illness, or other emergency **all of the following individuals MUST be contacted to grant approval:** the clinical site's student coordinator, the MLS instructor of the course, and the assigned trainer or lab section assigned to for the day of the expected absence. Should the unexpected absence result in prolonged absence from the externship experience, the instructor for the course will work with the student to develop an action plan for externship completion.

Absences that are not approved by the MLS program and the clinical site will be designated as **unexcused absences and result in a final grade reduction of 10% per day**. Time missed due to an unexcused absence will not be made up.

Minimum Requirements to Pass the Hematology Externship:

1. **Competency Checklist**
   Each student must achieve no less than the minimum performance level for each skill listed on the Clinical Competency Checklist. If a student receives less than the minimum performance level on any competency, the student may be referred to the Progress and Promotions Committee for evaluation at the discretion of the hematology faculty member.

2. **Professional Development Evaluation**
   - Each student **must achieve at least a 2 on each component of the Knowledge and Skills section** of the Professional Development Evaluation. If a student does not successfully meet all components, they will be referred to the Progress and Promotions Committee for evaluation and may not pass the externship.
   - Each student **must achieve at least a 2 on each component of the Habits and Attitudes section** of the Professional Development Evaluation. If a student does not successfully meet all components, they may be referred to the Progress and Promotions Committee at the discretion of the hematology faculty member.

3. **A score of 75% or higher on the written exam.** No repeat of the same exam will be given.

4. **Final Course grade of 75% or higher.**

Failure to Pass the Hematology Externship Course

If a student fails the hematology externship course they will be given the opportunity to remediate the deficiencies in performance. The type and length of mediation will be determined on a case-by-case basis by the hematology faculty member. A corrective action plan will be written.
(See Student Action Plan pp. 25-26)
The repeated externship rotation shall not exceed the number of weeks regularly scheduled for the hematology externship. The timing of the remediation will be dependent on the clinical site space and availability. This may result in a delay of graduation. The student must register to repeat the hematology externship course.

If a student fails to successfully remediate per the requirement of the corrective action plan, the case will be referred to the program Progress and Promotion Committee for resolution. The student may be dismissed from the program.

Hematology Laboratory Clinical Experience

Students will work with their clinical instructor(s) to complete the listed competencies. Accuracy, precision, timely reporting of results and demeanor must comply with the laboratory's acceptable standards. While working in the laboratory, the student must meet laboratory standards for work habit skills in patient confidentiality, communication skills laboratory safety, universal precautions, waste disposal, equipment, and work area maintenance.

Upon completion of the Hematology / Urinalysis rotation, the student will have successfully completed the following:

1. Correctly performs testing with the analyzers routinely used in the laboratory for hematology, hemostasis and urinalysis. This will include correctly troubleshooting analyzer performance problems, and also evaluating patient test results for critical values, short-sampling errors, and inappropriate specimens. The student will change or replace reagents / disposables as needed by the analyzer(s).

2. Correctly performs or assists in performing Daily and Weekly Preventative Maintenance of the hematology, hemostasis and urinalysis equipment routinely used in the laboratory.

3. Accurately summarizes the calibration procedures for any hematology, hemostasis and urinalysis analyzers used in the laboratory.

4. Correctly performs Daily/Shift QC procedures on the analyzers or test methods used. The student will learn the laboratory's SOP for resolving QC discrepancies, and then correctly apply those procedures, including all required documentation activities.

5. Correctly performs, or assists in performing, routine testing (as deemed appropriate for students by the clinical facility) in hematology, hemostasis and urinalysis.

6. Accurately reports test results (STATS, critical values, etc.) by telephone to a nurse, physician or other appropriate health care professional, according to the SOP used by the laboratory (as deemed appropriate for students by the clinical facility).

Hematology / Hemostasis /Urinalysis Clinical Competency Checklist

Student Name: _____

Clinical Site: _____ **Rotation Dates:** _____

Directions: Enter date/evaluator initials at level that the competency element was performed. The highlighted box is the minimum expected achievement.***It is the responsibility of the student to ensure that this form is filled out appropriately and submitted. When this is used every day as a learning tool it will give the student an opportunity to work up to the expected level of achievement.***

Scoring Scale

Discussed: Process/procedure was discussed, principle explained, student acknowledges an understanding of the process or principle.
Observed: Process/procedure was demonstrated by the clinical instructor and observed by student.
Practiced: Process/procedure practiced by student under direction and maximum supervision of the clinical instructor.
Performed: Process/procedure performed successfully under minimal supervision
Use 'N/A' in cases where no training opportunities are available, or procedures are not done in this lab

COMPETENCY ELEMENT	Discussed	Observed	Practiced	Performed
Laboratory Safety				
The Universal Precautions policy of the facility				
Wears protective gear as outlined by facility				
Demonstrates proper disposal technique of biohazard materials				
Always washes hands before leaving the laboratory area				
Knowledge of safety shower, eyewash station and all other lab safety equipment				
Hematology Instrumentation				
Instrument checks and routine preventative maintenance				
Daily start-up procedures and daily maintenance				
QC Procedures				
Compares QC results to control ranges and only accepts those within range				
Analyzes discrepancies for results that are not within control range				
Evaluates cumulative QC data for abnormalities				
Documents any instrument errors and corrective actions required				
Operate instrument used for routine Hematology analysis				
Trouble shoot Hematology instrumentation				
Reports patient results accurately and in a timely manner				
Enters results in laboratory information system				
Recognizes (correctly reports) critical patient values and delta check discrepancies				
Compare patient results to normal and therapeutic ranges as appropriate				

Competency Element	**Discussed**	**Observed**	**Practiced**	**Performed**
Hematology Procedures (if available)				
Verifies all patient and specimen identification data				
Identifies acceptable specimens to include anti-coagulant type, proper time interval, specimen character				
Automated CBC / Differential				
Make and stain blood smear				
Microscopic Differential Procedure (including RBC morphology and platelet estimate)				
Identifies **normal** or common cellular elements found in blood smears				
Identifies **abnormal** or uncommon cellular elements in blood smears				
Reticulocyte count automated and / or manual				
Manual WBC count				
Erythrocyte sedimentation Rate (ESR)				
Manual Platelet count				
Manual Hematocrit				
Sickle Cell Screen				
Bone Marrows (if available)				
Bone marrow slide prep				
Bone marrow stains				
Bone marrow differential procedure				
Body Fluids (if available)				
Cerebral Spinal fluid				
Serous fluids (peritoneal, pericardial, plural)				
Synovial fluid				
Seminal fluid				
Amniotic fluid				
Other:				
Hemostasis Instrumentation				
Instrument checks and routine preventative maintenance				
Daily start-up procedures and daily maintenance				
QC Procedures				
Compares QC results to control ranges and only accepts those within range				
Analyzes discrepancies for results that are not within control range				
Evaluates cumulative QC data for abnormalities				
Documents any instrument errors and corrective actions required				
Operate instrument used for routine coagulation analysis				
Trouble shoot Coagulation instrumentation				
Reports patient results accurately and in a timely manner				
Enters results in laboratory information system				

Competency Element	Discussed	Observed	Practiced	Performed
Hemostasis Instrumentation (continued)				
Recognizes (correctly reports) critical patient values and delta check discrepancies				
Compare patient results to normal and therapeutic ranges as appropriate				
Hemostasis Procedures (if available)				
Verifies all patient and specimen identification data				
Identifies acceptable specimens to include anti-coagulant type, proper time interval, specimen character				
Prothrombin Time (PT)				
Activated Partial Thromboplastin Time (APTT)				
Fibrinogen				
D-dimer				
Platelet Function Analyzer				
50:50 Mix				
Other Hematology/ Hemostasis Procedures Performed (Please List)				
Urinalysis Instrumentation				
Instrument checks and routine preventative maintenance				
Daily start-up procedures and daily maintenance				
QC Procedures				
Compares QC results to control ranges & only accepts those within range				
Analyzes discrepancies for results that are not within control range				
Evaluates cumulative QC data for abnormalities				
Documents any instrument errors and corrective actions required				
Operate instrument used for routine urinalysis				
Trouble shoot UA instrumentation				
Reports patient results accurately and in a timely manner				
Enters results in laboratory information system				
Recognizes (reports) critical patient values & delta check discrepancies				
Compare patient results to normal and therapeutic ranges as appropriate				

Competency Element	Discussed	Observed	Practiced	Performed
Urinalysis Procedures (if available)				
Identifies acceptable specimens to include proper time interval, specimen character				
Identifies urine sample color and appearance				
Ictotest				
Refractometer				
Urine Microscopic analysis				
Identifies common cellular elements found in urine				
Identifies common crystals found in urine				
Identifies common casts found in urine				
Distinguishes common microscopic artifacts from urinary formed elements				
Other Urinalysis Procedures Performed (please list)				

Please have all clinical instructors sign and date below.

Clinical Instructor Signature_____ **Date** _____

Clinical Instructor Signature_____ **Date** _____

Clinical Instructor Signature_____ **Date** _____

Clinical Instructor Signature_____ **Date** _____

Clinical Instructor Signature_____ **Date** _____

Clinical Instructor Signature_____ **Date** _____

Clinical Instructor Signature_____ **Date** _____

Clinical Instructor Signature_____ **Date** _____

Clinical Instructor Signature_____ **Date** _____

Clinical Instructor Signature_____ **Date** _____

Clinical Instructor Explanations or Comments: if needed:

Student: I have reviewed this competency evaluation. (Note: Signature does not necessarily denote agreement)

Student Signature_____Date _____

Student's comments, if desired: Please use additional paper if needed

Upon completing the competency form, please review it with the student. The clinical site should retain a copy for their files and the student is to return form by **upload to canvas**, email, fax, or mail to Dawn Taylor

Upload to Canvas (preferred)

Address: OHSU•OIT MLS Program
27500 SW Parkway Ave
Wilsonville, OR 97070
Attn: Dawn Taylor

Email: dawn.taylor@oit.edu
FAX # 503-218-1126
(Be sure to fax both sides of double-sided forms)
Questions: Email or call 503-821-1157

MLS 472
Microbiology / Infectious Serology
Externship

MLS 472 Microbiology/Infectious Serology Externship Syllabus-Fall 2022

Program Faculty: **Kristen Weber, MS MT(ASCP)**
Instructor
Work Phone: (503) 821-1290
Email: kristen.weber@oit.edu

Office Hours: Room 446 Because of the geographic distance between each externship student and the Oregon Tech MLS Program, it is expected that most communications will be conducted by email. Office hours can be arranged by contacting me via email or phone to schedule a specific appointment time.

Course Description: This course builds on theory, the practical application, technical performance and evaluation of procedures for isolation, identification and susceptibility testing of infectious disease organisms in humans. The course includes bacteriology, mycology, parasitology, virology, and serology, emphasizing the correlation of clinical laboratory data with the patient's diagnosis and treatment.

CRN: 10719 **Credit Hours:** 3 credits

Days, Times, Location: Established for each student by the program clinical coordinator and clinical externship sites.

Prerequisites: Successful completion of all didactic, pre-clinical coursework in the MLS program

Instruction: Instructional methods will include independent reading assignments, online Canvas assignments, and clinical experience. Students will work with their clinical instructor(s) to complete the listed competencies. Accuracy, precision, timely reporting of results and demeanor must comply with the laboratory's acceptable standards. While working in the laboratory, the student must meet laboratory standards for work habit skills in patient confidentiality, communication skills laboratory safety, universal precautions, waste disposal, equipment, and work area maintenance.

Program Student Learning Outcomes (PSLOs) addressed by Microbiology/ Infectious Serology Externship

The following outcomes are assessed by exam, competencies, and professional development evaluation.

1. Competency to perform a full range of testing in the contemporary medical laboratory encompassing pre-analytical, analytical, and post-analytical components of laboratory services in microbiology and infectious serology.
2. Proficiency to problem-solve, troubleshoot, and interpret results, and to use statistical approaches when evaluating data.
3. Professional and ethical conduct, respecting the feelings and needs of others, protecting the confidence of patient information, and never allowing personal concerns and biases to interfere with the welfare of patients.
4. Maintaining appropriate composure under stressful conditions.
5. Administrative skills consistent with philosophies of quality assurance, continuous quality improvement
6. Application of safety and governmental regulations and standards as applied to medical laboratory practice.
7. Effective communication skills to ensure accurate and appropriate information transfer.

Course Objectives

Upon successful completion of the Microbiology/Infectious Serology Externship, the student will:

1. Demonstrate a working knowledge of standard laboratory procedures performed in bacteriology, parasitology, mycology, virology and serology.
2. Perform laboratory procedures with accuracy and efficiency to provide quality patient care.
3. Assess the laboratory's role in the diagnosis and treatment of disease states.
4. Assess the role of quality control in the clinical microbiology laboratory.
5. Demonstrate proper procedure and technique when handling clinical specimens.
6. Demonstrate the ability to effectively communicate with the healthcare team, peers, patients and the public.
7. Effectively utilize clinical information systems to process patient data.

Required Textbook: Harr, Robert R. (2019). *Medical Laboratory Science Review* (5th ed.).
ISBN-13: 978-0803668270 ISBN-10: 0803668279

Resources posted on Canvas:

- Microbiology Resources: Includes organism flow charts and ASM Antimicrobial Susceptibility Testing resource.
- Practice Quizzes: There are several practice quizzes posted that can be used for review. There is no grade associated with these quizzes.

Grading:

- **Final Externship Exam 70%**
  The theoretical aspects of this course will be assessed by the final exam.
  Students must receive a score of at least 75% on the exam to pass the externship.
  Exam questions come from the required textbook: **Harr, Robert R. (2019).** ***Medical Laboratory Science Review*** **(5th ed.).**

  Exam questions will be selected from Chapter 8: Microbiology (all sections 8.1-8.12)

  - **If the clinical site has the capability, the student will take this exam online by logging into their Canvas account. The exam MUST be taken at the clinical site on the final day of your rotation unless other arrangements are made with MLS program faculty.**
  - **The online exam is timed for 3 ½ hours. Once the exam is started, it must be finished. The date and time you take the exam is recorded.**
  - **DO NOT OPEN THE EXAM BEFORE YOU ARE SCHEDULED TO TAKE IT; YOU WILL BE FORCED TO COMPLETE IT.**
  - **Questions may have different wording, answers, or order of answers.**
  - **If there are technical difficulties while taking the exam, the clinical site will have a paper copy available.**
  - **No repeat exams will be given.**

- **Attendance** **20%**
  Due to the accelerated nature of the externship, daily attendance is required and will be monitored. The attendance policy outlined in the externship handbook will be strictly enforced. All excused absences time must be made up by the student unless exempted by the MLS program.

  Each unexcused absence will result in a 10% reduction of the final course grade. An unexcused absence is defined as not contacting the clinical site and the MLS program prior to the start of the student's "shift" at the site if there is an absence. There will be no additional time allotted for unexcused absences.

- **Student Evaluation of the Externship** **5%**
  It is the student's responsibility to complete an evaluation of the externship. This will be done via an online survey.

- **Student Competency Checklist** **5%**
  It is the student's responsibility to make sure that the competency checklist for Microbiology/ Infectious Serology is filled out appropriately and submitted to the MLS faculty.

Grading Scale:

92.0 – 100%	A
82.0 – 91.9%	B
75.0 – 81.9%	C
60.0 – 74.9%	D
Less than 60.0%	F

<u>Minimum requirements to pass the Microbiology Externship:</u>

1. Competency Checklist
   Each student must achieve no less than the minimum performance level for each skill listed on the Clinical Competency Checklist. If a student receives less than the minimum performance level on any competency, the student may be referred to the Progress and Promotions Committee for evaluation at the discretion of the program director, education coordinator, and appropriate faculty member.

2. Professional Development Evaluation
   Each student **must achieve at least a 2 on each component of the Knowledge and Skills section** of the Professional Development Evaluation. If a student does not successfully meet all components, they will be referred to the Progress and Promotions Committee for evaluation and may not pass the externship.

   Each student **must achieve at least a 2 on each component of the Habits and Attitudes section** of the Professional Development Evaluation. If a student does not successfully meet all components, they may be referred to the Progress and Promotions Committee at the discretion of the program director, education coordinator, and appropriate faculty member.

3. A score of 75% or higher on the written exam

4. Final Course Grade of 75% (C) or higher.

Due Dates:

The competency checklist, professional development evaluation, the written exam, and the student evaluation of the externship site are all **due by 5pm on the Monday following the completion of the rotation**, except for final rotation. For this final rotation, all paperwork is **due by Noon on the final day of the rotation, Wednesday, December 7th.** For each item the student is responsible for turning in, there will be a 1% deduction from the final course grade for every day it is late.

All items may be submitted by Canvas submission (preferred) , email (scanned PDF's) or FAX..

Failure to Pass the Microbiology Externship Course:

If a student fails the microbiology externship course they will be given the opportunity to remediate the deficiencies in performance. The type and length of mediation will be determined on a case by case basis. A corrective action plan will be written. (See Student Action Plan pp. 23-24)

The length of the remediation will be established by the microbiology faculty member. The repeated externship rotation shall not exceed the number of weeks regularly scheduled for the microbiology externship.

The timing of the remediation will be dependent on the clinical site space and availability. This may result in a delay of graduation.

The student must register to repeat the microbiology externship course.

Academic Integrity:
The topic of academic integrity and cheating has been thoroughly covered in the MLS student handbook. Please be aware that all policies and protocols outlined therein are in full effect. A charge of cheating can have severe consequences.

Disability Statement:
See the University syllabus available on Canvas

Microbiology/Infectious Serology Clinical Competency Checklist

Student Name: _____

Clinical Site: _____ **Rotation Dates:** _____

Directions: Enter date/evaluator initials at level that the competency element was performed.
The highlighted box is the minimum expected achievement.
It is the responsibility of the student to ensure that this form is filled out appropriately and submitted. When this is used every day as a learning tool it will give the student an opportunity to work up to the expected level of achievement.

Scoring Scale

Discussed: Process/procedure was discussed, principle explained, student acknowledges an understanding of the process or principle.
Observed: Process/procedure was demonstrated by the clinical instructor and observed by student.
Practiced: Process/procedure practiced by student under direction and maximum supervision of the clinical instructor.
Performed: Process/procedure performed successfully under minimal supervision
Use 'N/A' in cases where no training opportunities are available, or procedures are not done in this lab

COMPETENCY ELEMENT	Discussed	Observed	Practiced	Performed
Laboratory Safety—strictly adheres to or accurately summarizes the following:				
Wears personal protective equipment as outlined by facility				
The universal precautions of the facility				
Demonstrates proper disposal of biohazard material and sharps				
Always washes hands before leaving the laboratory area				
Demonstrates location of safety shower, eyewash station, and all other lab safety equipment				
Locates MSDS				
Locates laboratory's fire safety plan				
Disinfects work area as indicated by facility policy				
Demonstrates proper use of biological safety cabinet				
Specimen Setup—accurately performs the following:				
Label specimens and media according to facility policies				
Selects proper primary media for specimens including plated media, broth media, and slides for Gram stain				
Identifies acceptable and unacceptable specimens				
Follows laboratory's policy and protocol for handling unacceptable specimen				
COMPETENCY ELEMENT	Discussed	Observed	Practiced	Performed

Proper inoculation and streaking of primary media for isolation and quantitative streaking for urines				
Selects the appropriate incubation temperature and atmosphere for cultures including anaerobic cultures				
Quality Control—accurately performs, documents, and takes corrective action if QC results are unacceptable on the following:				
Media				
Reagents (stains, biochemical, kits)				
Susceptibility testing				
Temperatures of refrigerators, freezers, and incubators				
Other:				
Gram Staining—accurately performs the following:				
Gram staining from culture and broth media				
Gram staining of direct clinical specimen				
Reading, interpreting, and reporting of direct Gram stains, including wounds, genitals, body fluids, positive blood cultures, and sputum samples.				
Evaluation of Primary Cultures—accurately evaluates the following:				
Stool cultures: recognize what is normal flora and what is a possible pathogen and selects correct next course of action				
Throat cultures Recognize normal flora and selects next course of action				
Urine cultures Recognize when identification and susceptibility testing is warranted				
Genital cultures recognize what is normal flora and what is significant				
Blood and Body Fluid Cultures Evaluate appropriately				
Wound cultures recognize what is significant, and select next course of action				
Respiratory cultures, Recognize normal respiratory flora, what may be a significant pathogen, and select next course of action				
Antimicrobial Susceptibility Testing—accurately performs or summarizes the following:				
Prepare suspensions for automated identification/susceptibility (Vitek, Microscan, etc.)				

COMPETENCY ELEMENT	Discussed	Observed	Practiced	Performed
Operate the automated identification/susceptibility instrument (Vitek, Microscan, etc.)				
Discuss guidelines for MIC and breakpoint ranges				
Discuss antimicrobial resistance: MRSA, VRE, ESBL, VRSA, Dtest, CRE				
Set up, measure zone sizes, and interpret disk diffusion susceptibility				
Set up and interpret E test				
Set up and interpret D test				
Set up and interpret ESBL screen				
Other antimicrobial resistance screens				
Recognize and troubleshoot results that do not correlate with the expected result				
Blood Culture Processing --accurately performs or summarizes the following:				
Explain the principle of operation of the instrument used for blood cultures. Name of instrument:				
Explain the specimen collection requirements for blood cultures (i.e. proper collection procedure, volume, timing, etc.)				
Unloading of negative blood cultures				
Processing of positive blood cultures including subcultures, Gram stains, and proper reporting				
Identification of Organisms--accurately performs the following (please list tests performed i.e. catalase, oxidase, API, etc.):				
Recognize and perform tests to identify *Streptococcus* species				
Recognize and perform tests to identify *Staphylococcus* species				
Recognize and perform tests to identify *Neisseria* species/*M. catarrhalis*				
Recognize and perform tests to identify *Haemophilus* species				
Recognize and perform biochemical tests to identify Enterobacteriaceae				
Recognize and perform biochemical tests to identify Non fermenters				
Recognize and perform biochemical tests to identify miscellaneous GNBs				
Recognize and perform tests to identify Gram-positive bacilli				
Recognize and perform tests to identify anaerobes.				
Interpretation and Acceptance of Results—accurately performs the following:				
Discuss the recording, reporting, and documenting results				
COMPETENCY ELEMENT	Discussed	Observed	Practiced	Performed

Discuss which organisms are reportable to the State Health Department				
Mycobacteria—accurately performs the following:				
Digestion and concentration of specimens for Mycobacteria culture				
Perform and interpret direct smears for acid-fast organisms				
Perform and interpret concentrated smears for acid-fast organisms				
Tests for identification of Mycobacteria (please list tests performed)				
Mycology—accurately performs, interprets, or explains the following:				
Demonstrates correct technique in performing a lactophenol cotton blue mount for fungal mycology				
Performs correct technique in performing a wet mount of fungal cultures				
Chooses appropriate media and incubation temperatures for fungal cultures				
Explains the significance of two separate incubation temperatures in the identification of dimorphic fungi				
Performs and interprets the Germ tube test on suspected Candida sp.				
Other identification tests for fungi (please list tests performed i.e. Trichophyton agars, API, etc.)				
Parasitology—accurately performs the following:				
Evaluate specimen collection, transport, and storage requirements to determine acceptability of specimen received				
Perform O & P flotation/concentration procedures				
Perform trichrome stain				
Demonstrate proper technique in preparing a saline and/or iodine wet mount				
Correctly identifies parasites in stool specimens via patient and/or proficiency specimens				
Molecular Testing—accurately performs the following:				
Review molecular testing at your facility if available (List any assay performed and the instrumentation used)				

***Use 'N/A' in cases where no training opportunities are available, or procedures are not done in this lab*

Clinical Instructor Explanations or Comments: if needed:

Please have all clinical instructors sign and date below.

	Clinical Instructor

Signature_____ **Date** _____

Clinical Instructor Signature_____ **Date** _____

Clinical Instructor Signature_____**Date** _____

Clinical Instructor Signature_____**Date** _____

Clinical Instructor Signature_____**Date** _____

Clinical Instructor Signature_____ **Date** _____

I have reviewed this competency evaluation. (Note: Signature does not necessarily denote agreement)

Student Signature_____**Date** _____

Student's comments, if desired: please use additional paper if needed

Upon completing competency form, review with student. The clinical site should retain a copy for their files and the student is to return form by **upload to canvas**, email, fax or mail to Kristen Weber.

Upload to Canvas (preferred)

Address: OHSU•OIT MLS Program
27500 SW Parkway Ave
Attn: Rachelle Barrett
Wilsonville, OR 97070

Email: Rachelle.barrett@oit.edu
FAX # 503-218-1126
(Be sure to fax both sides of double-sided forms)
Questions: Email or call 503-821-1290 (VM)

MLS 473
Immunohematology
Externship

MLS 473 Immunohematology Externship Syllabus – Fall 2022

Course Faculty: **Rachelle Barrett, MS, MLS (ASCP) SBB**

Contact Information: Phone:(503) 821-1147 E-mail: rachelle.barrett@oit.edu

CRN: 10720 **Credit Hours:** 3

Office Hours: 4pm-7pm M-F. Because of the geographic distance between each externship student and the MLS Program, it is expected that most communications will be conducted electronically or by phone/zoom.

Course Description: Practical experience at an approved off-campus clinical site emphasizing application of knowledge and skills to perform a wide variety of testing in a contemporary blood bank laboratory and further develop discipline-specific bank laboratory and further develop discipline-specific competency. Prerequisite: successful completion of all didactic, pre-clinical coursework in the MLS program.

Prerequisites: Successful completion of all didactic, pre-clinical coursework in the MLS program

Externship Location: Each student will have an assigned externship which is selected by the MLS Program Clinical Coordinator. Each immunohematology externship MLS student will have an assigned clinical laboratory site. In some rare cases, multiple clinical sites may be used.

Days/ Times/ Location: Established for each student by the program clinical coordinator and clinical externship sites.

Required Textbook: Harr, Robert R. (2019). *Medical Laboratory Science Review* (5th ed.).
ISBN-13: 978-0803668270 ISBN-10: 0803668279

Immunohematology Externship Course Objectives:

Instruction Format

The clinical rotation experience is innately student-centered, structurally fluid, and provides opportunity for each student to further develop the knowledge and the skills consistent with those expected of a career entry-level medical laboratory scientist working in a contemporary blood bank/transfusion service. It is anticipated that each student will receive individualized instruction during the training period at the assigned clinical affiliate and that each student will also be afforded opportunities to work independently under minimal supervision. During the immunohematology externship, the expectation is that each student may be actively engaged in any or all of the following:

- specimen evaluation
- sample analysis
- instrument and equipment training
- component processing
- component selection
- Communication of results
- quality assurance activities

The externship experience on-site in the working clinical laboratory setting may be disrupted for a variety of unprecedented reasons. Thus, the clinical externship experience will focus on student completion of competencies in the area of immunohematology and student exposure to clinical laboratory workflow from pre-analytical, analytical, to post-analytical test performance. Many of the required learning activities may be completed through simulated laboratory experience on campus, interviews with professional laboratorians, and student research.

Goals and Objectives

The educational goals of the immunohematology externship course are:
Goal 1 – Students will demonstrate technical competency in the contemporary blood bank setting.
Goal 2 – Students will demonstrate professionalism in the contemporary blood bank setting.

It is the expectation that by the end of this course students should be able to complete the following assignments to the standards described by the course goal, program goal and university goal they are aligned to:

University Goal	Program Goal	Course Goal	Assignment
Demonstrate Proficiency with Quantitative literacy	Demonstrate Competency to perform a full range of testing in the contemporary medical laboratory encompassing pre-analytical, analytical, and post-analytical components of laboratory	Test samples in accordance with the policies and practices of the affiliate laboratory. Correctly use equipment and operate instruments found in the immunohematology department of the laboratory. Understand how to report results within expected turnaround times.	PDE #10. Obtains accurate a precise results.
Demonstrate Proficiency with Inquiry & Analysis	Demonstrate Proficiency to problem-solve, troubleshoot, and interpret results, and to use statistical approaches when evaluating data.	Judge the suitability of a Type and Crossmatch specimen for analysis. Prioritize and manage blood component inventory. Analyze data to accept or reject results and identify appropriate follow-up testing.	PDE #18. Shows logical thinking and resourcefulness in dealing with problems.
Demonstrate Proficiency with Ethics & Global and Diverse perspectives	Professional and ethical conduct, respecting the culture and diversity of individual preference of others, protecting the confidence of patient information, and never allowing personal concerns and biases to interfere with the welfare of patients.	Demonstrate ethical behavior and maintain confidentiality in terms of patient results and status.	PDE#36. Demonstrates integrity and ethical behavior.
Demonstrate proficiency with Teamwork	Demonstrate maintaining appropriate composure during stressful situations.	Maintain composure during interruptions and times of stress.	PDE #8. Maintains work quality and quantity under stress
Demonstrate proficiency with communication.	Demonstrate effective communication skills to ensure accurate and appropriate information transfer.	Interact professionally with patients and other personnel.	PDE #50. Receives/gives information to others effectively and courteously.
	Demonstrate Administrative skills consistent with philosophies of quality assurance, continuous quality improvement, laboratory education, fiscal resource management.	Perform appropriate Quality control testing.	PDE #7. Performs appropriate quality control/quality assurance activities.

	Application of safety and governmental regulations and standards as applied to medical laboratory practice.	Conform to all safety regulations within the laboratory.	PDE #3. Follows laboratory institutional safety policies.

Academic Integrity:

The topic of academic integrity and cheating has been thoroughly covered in the MLS student handbook. Please be aware that all policies and protocols outlined therein are in full effect. A charge of cheating can have severe consequences

Course Grade

To successfully complete and pass the immunohematology externship course with a grade of 'C' (≥75%) a student should:

- Meet course **Attendance** requirements
- Achieve a score of ≥ 75% on 2 of 4 **Proficiency Tests**
- Receive no score < 2 on the **Professional Development Evaluation** (PDE)
- Complete a **paper** on the site's method of antibody screen
- Complete the process flow **Diagrams**
- Return the **Evaluation** of Externship
- Complete the final **Exam** for Immunohematology with a score of ≥ 75%

Grade Element	**Weighted Value (%)**
Final Exam (Administered on-line)	40
Proficiency Testing (PT) – Complete 2 of 4 available	20
Competency Checklist Completion	20
Process Flow Diagrams	10
Methodology Paper	5
Evaluation of Externship	5
TOTAL*	100
Grading Scale: 100-92% = A; 91-82% = B; 81-75% = C; 74-60% = D; <60% = F *Deductions: 10% for each unexcused absence	

Failure to Pass the Immunohematology Externship Course

If a student fails the immunohematology externship course they will be given the opportunity to remediate the deficiencies in performance. The type and length of mediation will be determined on a case-by-case basis by the immunohematology faculty member. A corrective action plan will be written. The repeated externship rotation shall not exceed the number of weeks regularly scheduled for the immunohematology externship. The timing of the remediation will be dependent on the clinical site space and availability. This may result in a *delay* of graduation. If a student fails to successfully remediate per the requirement of the corrective action plan, the case will be referred to the program Progress and Promotion Committee for resolution. The student may be dismissed from the program.

Due Dates:

The Method Paper& Diagrams are due by **5pm Friday** the last day of externship. The completed competency checklist, Proficiency test forms, professional development evaluation, and the student evaluation of the externship site are all **due by 5pm on the Monday following the completion of the rotation**, except for the final rotation. For this final rotation, all paperwork is **due by Noon on the final day of the rotation, Wednesday in December** before graduation**.**

Course Assessments

Attendance

There is no graded component in the course for attendance, instead students are expected to adhere to the indicated schedule as a demonstration of professional conduct. Students are required to attend externship 40 hours a week on time for the assigned schedule. Students are not required to attend externship during the designated school holidays.

Egregious **tardiness** will not be tolerated at the clinical site and will result in 5% grade reduction per consultation between the clinical site and the instructor.

In the case of anticipated absences, illness, or other emergency all of the following individuals MUST be contacted to grant approval: the clinical site student coordinator, the instructor of the course, and the assigned trainer for the day of the expected absence. Should the unexpected absence result in prolonged absence from the externship experience, the instructor for the course will work with the student to develop an action plan for externship completion.

Absences that are not approved (for example a no-call/no-show) will be designated as **unexcused absences** and result in a final grade reduction of 10% per day.

Paperwork

Forms completed at the externship site will be returned to the course instructor by upload to the Canvas course shell. Students are responsible for using the following attached forms:

1. Competency forms
2. Proficiency testing forms
3. PDE

Final Exam

The final exam is administered on-line on the final day of the externship rotation and composed of multiple choice questions that challenge a student's aptitude in immunohematology. Multiple choice questions are written to address the three learning domains: the cognitive, the psychomotor, and the affective.

Roles and responsibilities for the final exam are:

1. The **course instructor** sets the exam availability date and time.
    - The student will take the exam online by logging into his/her school account during the designated time.
    - Students have only 120 minutes to complete the exam. *Note: Once the exam is started, it must be finished. The date and time when a student takes the exam is digitally tracked and recorded.*
2. The immunohematology **externship supervisor** or designee provides proctor oversight, a computer that has internet/web access, and time to take the exam.
    - The exam must be taken at the clinical site on the final day of the externship unless other arrangements are made with MLS program faculty.
    - A paper copy of the exam will be available to the clinical site coordinator for cases of technical difficulty. *Note: Only the completed answer sheet needs to be returned by the proctor to the course instructor on the day of the exam.*
3. The MLS **student** prepares for the Exam.
   All exam questions will be taken from Harr, Robert R. (2019). *Medical Laboratory Science Review* (5th ed.) ISBN-13: 978-0803668270 ISBN-10: 0803668279
    - Utilize a scientific calculator not on a phone.

Methodology Paper

Understanding the method of antibody screen performed in the blood bank can assist the technologist in trouble shooting antibody identification activities. Each student should research the methodology performed at their particular clinical site (*In the event that externship experience does not include antibody screen methodology, the instructor will assign an automated immunohematology platform to students.*) and write a 1–2 page paper covering the following topics:

- How was the method invented? Who and Where.
- How is the method performed? List the steps.
- What are the pros and cons of the method compared to other methods available?

The completed paper should be uploaded to the Canvas Course shell by **5pm Friday** on the last day of the externship. Papers will be graded according to the rubric posted in the course shell.

Process Flow Diagrams

Throughout the clinical coursework, students have been taught the pieces of serological testing and how it is applied to patient cases. This assignment requires that students develop a decision tree in choosing follow-up testing to perform during specific case situations. It is best to complete these diagrams before the clinical externship begins so that the student is ready to perform the work during the clinical experience. However, these diagrams may be completed at the site as the student follows written laboratory protocols. Examples are provided in the canvas course shell. It is expected that the diagrams will be the students' own product. They are due to be uploaded to the course shell by **5pm Friday** on the last day of the externship.

Proficiency Testing (PT)

Each student must demonstrate the ability to produce accurate results when running basic tests in the clinical immunohematology department within a time frame suitable for patient care. Proficiency Test Challenges are assigned to students completing the Immunohematology Externship in addition to competency checklists. Students have the choice to perform proficiency testing on 2 of the following challenges:

1) Type and Screen
2) Antibody Identification
3) Type and Crossmatch
4) Transfusion Reaction Workup

Students may complete the challenge at any point during the externship rotation time in Immunohematology. Students must use the clinical site methods and procedures in the completion of testing on a given patient sample where previous test results have already been resulted. After completing the testing, results will be verified by the clinical trainer and the Proficiency Testing form filled out. The Proficiency Testing form will be returned to the course instructor by Canvas Course shell upload by **5pm Monday** after the course rotation completes.

Competency Assessment

The immunohematology externship is meant to give students experience in tasks that are regularly performed in the clinical lab immunohematology department. Not all tasks that can be performed in any immunohematology department will be available at all externship sites; the sites will have test menus specific to the patient populations they serve. Nor will all tasks on the site's testing menu be ordered while a student is present to perform patient testing. With this understanding, students may become familiar with how the externship site performs or sends out the items listed on the competency checklist through discussion, observation or physical test performance. If the task can be performed at the site, every effort to do so should be made by the student.

Items on the checklist are organized into pre-analytical, analytical and post-analytical test performance operations. Students should record how they experienced each of the tasks listed on the checklist at their clinical site, discussion, observation, or physical test performance. This checklist serves as a record of the student's clinical experience.

At the end of the externship, the competency checklist will be reviewed for completion by the immunohematology department clinical coordinator and discussed with the student. The form should be signed by both the student and the clinical coordinator before being returned to the course instructor by **5pm Monday** after the externship ends. The form should be uploaded to the course shell.

Professional Development Evaluation
The clinical externship experience is meant to give students experience in the clinical laboratory as a workplace. Students will interact with coworkers, patients and other caregivers and perform tasks in a competent and professional manner. Students will experience workflow, teamwork and problem solving as well as stressful or ethical dilemmas in the normal course of working.

The professional development evaluation must be completed whenever a student performs professionally in a new department. The designated trainer in the department or clinical coordinator for the department should rate the student's professionalism according to their experience with the student. The ratings are does not meet, meet, or exceeds on each of the professional items listed.

At the end of the externship, the clinical coordinator will discuss the ratings in the professional development evaluation with the student. Both the student and the clinical coordinator will sign the form before returning it to the course instructor by **5pm Monday** after the externship ends. The form should be uploaded to the course shell.

Externship Site Evaluation
Each student is responsible for completing the on-line externship site evaluation upon completion of their immunohematology externship. This information gives the instructors feedback regarding the professionalism of the site and the experiences provided for student learning from the externship site as well as student preparation for the externship experience as a whole. The survey will be administered in the Canvas course shell.

FORM 1 - Proficiency Testing (PT): Pre-transfusion Testing - Type and Screen

STUDENT NAME: _____

Date:_____

Student Instructions:

1. Obtain a patient sample from the immunohematology externship supervisor or designated teaching staff.
2. Following the laboratory's procedure, perform a type and screen within the turn-around time (TAT) established by the lab for 'routine' testing.
    a. If the TAT is exceeded, another attempt must be made on a different Type and Screen sample.
3. Report the results following the lab's established protocol or per the instructions provided by the immunohematology externship supervisor.
4. Identify any additional testing that may be required given the results.

Evaluator Instructions:

1. Choose a previously resulted Type and Screen sample for the student to perform testing on.
2. Fill in the Lab Set Values in the table below for method, TAT, results history, and reflex ordering for the selected specimen.
3. Do not assist student during test performance. At the completion of testing, record student values for TAT, results and reflex testing response.
4. Circle the points for each criteria met. Then total the results at bottom.

Procedure	Criteria	Lab Set Value	Student Value	Points
Type & Screen	The type and screen testing, <u>including reporting results</u>, is completed within the turn-around time (TAT) established by the lab for 'routine' testing.	Method: _____ TAT _____	Completed in: _____	5
	Test result interpretations are in agreement with results already reported by the blood bank.	Previous History _____	Type & Screen Results: _____	5
	Student identifies reflex testing to be performed (does not have to perform the reflex testing), if indicated.	Reflex Testing Ordered _____	Student Response _____	5
	Student Performs Testing without aid in a single attempt.		Yes or No	5
			Total Points:	

Evaluator Signature: _____ Date: _____

Student Signature: _____ Date:_____

☐ I acknowledge that this evaluation has been discussed with me.

FORM 2 - Proficiency Testing (PT): Compatibility Testing – Type and **Crossmatch**
STUDENT NAME: _____
Date:_____

Student Instructions:

1. Obtain a patient sample from the immunohematology externship supervisor or designated teaching staff.
2. Following the laboratory's procedure, perform a type and crossmatch in order to provide 2-packed red blood cell (PRBC) units for transfusion of the patient represented by the sample provided within the laboratory's designated TAT for routine crossmatching procedures.
    a. If the TAT is exceeded, another attempt must be made on a different Crossmatch sample.
3. Choose units for crossmatch that are in adherence to the laboratory's inventory management practices.
4. Report the results following the lab's established protocol or per the instructions provided by the immunohematology externship supervisor.
5. Identify any additional testing that may be required given the results.

Evaluator Instructions:

1. Choose a previously resulted Type and Screen or Crossmatch sample for the student to perform testing on.
2. Fill in the Lab Set Values in the table below for method, TAT, results history and reflex ordering for the selected specimen.
3. Do not assist student during test performance. At the completion of testing, record student values for TAT, results and reflex testing response.
4. Circle the points for each criteria met. Then total the results at bottom.

Procedure	Criteria	Lab Set Value	Student Value	Points
Type & Crossmatch	The type and crossmatch testing, <u>including reporting results</u>, is completed within the turn-around time (TAT) established by the lab for 'routine' testing.	Method: _____ TAT _____	Completed in: _____	5
	Test result interpretations are in agreement with results already reported by the blood bank.	Previous History _____	Type & Screen Results: _____	5
	Student identifies reflex testing to be performed (does not have to perform the reflex testing), if indicated.	Reflex Testing Ordered _____	Student Response _____	5
	The lab's inventory management practices have been correctly applied to the selection of donor units based on the blood bank's inventory		Yes or No	5
			Total Points:	

Evaluator Signature: _____ Date: _____

Student Signature: _____ Date:_____
☐ I acknowledge that this evaluation has been discussed with me.

FORM 3 - Proficiency Testing (PT): Transfusion Reaction Investigation

STUDENT NAME: _____

Date:_____

Student Instructions:

1. Obtain a post transfusion patient sample from the immunohematology externship supervisor or designated teaching staff. (Blood bag and pre-transfusion sample may be provided for reference)
2. Following the laboratory's procedures, perform a suspected hemolytic transfusion reaction investigation limited to performance of: direct antiglobulin testing, clerical check, ABO/Rh and hemolysis check of the sample.
3. Record results of investigation on the form provided by the lab; correctly report all results within expected TAT for the lab's transfusion investigation procedures.
4. Identify which results are critical to report to the pathologist and physician caring for the patient.

Evaluator Instructions:

1. Choose a previously resulted Crossmatch sample for the student to perform testing on.
2. Fill in the Lab Set Values in the table below for TAT and results history.
3. At the completion of testing, record student values for TAT, and results.
4. Discuss findings with student.
5. Review student entries for clerical check and hemolysis grading for accuracy.
6. Circle the points for each criteria met. Then total the results at bottom.

Procedure	Criteria	Lab Set Value	Student Value	Points
Transfusion Reaction Investigation	The Type and DAT testing, <u>including reporting results</u>, is completed within the turn-around time (TAT) established by the lab for 'routine' testing.	Expected TAT _____	Completed in: _____	5
	Test result interpretations are in agreement with results already reported by the blood bank.	Previous ABO/Rh _____	ABO/Rh Results: _____	5
	Student identifies any critical test results indicative of hemolytic transfusion reaction.		Yes or No	5
	Student's clerical reporting and hemolysis judgement match expected results.		Yes or No	5
			Total Points:	

Evaluator Signature: _____ Date: _____

Student Signature: _____ Date:_____

☐ I acknowledge that this evaluation has been discussed with me.

FORM 4 - Proficiency Testing (PT): Antibody Identification

STUDENT NAME: _____

Date:_____

Student Instructions:

1. Obtain one blood specimen from the immunohematology externship supervisor or designated affiliate staff. Sample may be plasma or serum and may or may not be previously frozen.
2. Following the laboratory's procedure, perform antibody identification procedures and applicable reflex testing within the turn-around time (TAT) established by the lab for 'routine' testing.
    a. If the TAT is exceeded, another attempt must be made on a different sample.
3. Perform rule out/ rule in procedures according to the laboratory's defined SOP.
4. Report the results following the lab's established protocol or per the instructions provided by the immunohematology externship supervisor.

Evaluator Instructions:

1. Choose a previously resulted antibody ID sample for student to perform testing on. *If the sample is frozen, please provide red cells to mimic those of the patient.*
2. Fill in the Lab Set Values in the table below for TAT and results history for the selected specimen.
3. Do not assist student during test performance. At the completion of testing, record student values for TAT and antibody ID results.
4. Review student work for following applicable SOP guidelines regarding rule outs/ rule ins and reflex testing.
5. Circle the points for each criteria met. Then total the results at bottom.

Procedure	Criteria	Lab Set Value	Student Value	Points
Antibody ID	All antibody identification testing, <u>including reporting results</u>, is completed within the turn-around time (TAT) established by the lab for 'routine' testing.	TAT _____	Completed in: _____	5
	Test result interpretations are in agreement with results already reported by the blood bank.	Previous History _____	Resulted ID: _____	5
	Student identifies and performs applicable reflex testing.		Yes or No	5
	Student rules out and in all clinically significant antibodies according to laboratory SOPs		Yes or No	5
			Total Points:	

Evaluator Signature: _____ Date: _____

Student Signature: _____ Date:_____

☐ I acknowledge that this evaluation has been discussed with me.

Form 5 Immunohematology Externship Competency Levels of Achievement

Student Name: _____ **Rotation Dates:** _____

Externship Site: _____

Directions: Enter date/evaluator initials at level that the competency element was performed.
Students may progress to any level depending on laboratory test menu. Suggested areas of focus are highlighted on the form.

Scoring Scale

Discussed: process/procedure was discussed, principle explained, student acknowledges an understanding of the process or principle.
Demonstrated/Observed: process/procedure was demonstrated by the clinical instructor and observed by student.
Process/procedure practiced by student under the direction and maximum supervision of the clinical instructor.
Process/procedure performed successfully under minimal **supervision**
Use 'N/A' in cases where no training opportunities are available, or procedures are not done in this lab

COMPETENCY ELEMENT	Discussed	Observed	Practiced	Performed
Recognize elements of the Pre-Analytical Testing Phase that impact results of analytical testing.				
Testing requests and patient sample identification requirements				
Sample suitability requirements for analysis				
Sample rejection protocol				
Specimen processing activities				
Performs Appropriate Quality Control Activities				
QC of reagents (daily, weekly, as needed)				
Instrument and Equipment maintenance activities				
Workup of QC failures				
Work area organization				
Competently performs analytical testing routinely performed in the immunohematology department.				
Reading and Grading of Agglutination reactions				
ABO grouping				
Recognize and resolve ABO discrepancies per lab policy/procedure				
Rh typing, including weak D				
Antibody Screen				
Antibody ID per lab protocol				
Compatibility Testing				
Direct Antiglobulin Testing				
Abnormal crossmatch options & special techniques Describe:				
Cord blood Workup				
Rhogam Workup				

Form 5 Immunohematology Externship Competency Levels of Achievement

COMPETENCY ELEMENT	Discussed	Observed	Practiced	Performed
Conforms to laboratory policies for appropriate communication, records review and records documentation Post-analytical Testing Phase, Records, Communication				
Results Reporting				
Compares patient results to previous results as appropriate & recognizes discrepancies				
Accessing lab SOPs				
Situations in which one should call the pathologist				
Send out procedures				
Verbal order policy				
Critical values				
Conforms to Laboratory Safety Policies				
Policies governing hand washing, wearing of PPE, and the disposal of hazardous materials/ waste.				
Safely uses equipment and operates instrumentation				
Working knowledge of safety shower, eyewash station, fire extinguisher and all other lab safety equipment				
Handles, Processes and Selects Components according to laboratory inventory management guidelines.				
PRBCs storage, inventory management				
PRBCs unit Retype				
PLTs storage, inventory management				
FFP processing, storage and inventory management				
Other Component (Specify_____) processing, storage and inventory management				
Autologous or Directed components processing, storage and inventory management				
Issuance of blood products for Transfusion				
Emergency Uncrossmatched Situations				
Disposal of blood products				
Performs Reflex tests, Procedures, and Protocols (If available) according to laboratory SOP				
A sub-grouping				
Rh phenotyping				
Patient or donor phenotyping				
Elution technique				
Antibody Titer				
Transfusion Reaction workup for facility				
Autoimmune hemolytic anemia workup				
Massive Transfusion protocol				
Other (please list):				
Other (please list):				

Form 5 Immunohematology Externship Competency Levels of Achievement

COMPETENCY ELEMENT	Discussed	Observed	Practiced	Performed
Use other Technologies and Automation (If available) in accordance with laboratory policy:				
Cell Washer				
Automated Analyzer. Specify: _____				
Gel Workstation				
Irradiator				
Sterile Docking Device				
Platelet Rotator				
Incubators/Thermal Units				
Centrifuges				
Other. Specify: _____				

Evaluator's Comments

_____

Evaluator's Signature **Date**

_____

Student Signature **Date**

□ **This Competency evaluation has been reviewed with me.**

(Please place student comments on reverse if needed)

MLS 463
Foundations of MLS III

MLS 463
Foundations of MLS III

MLS 463 Foundations of MLS III Externship Syllabus – Fall 2022

Course Faculty: Rachelle Barrett, MS, MLS (ASCP) SBB

Contact Information: Phone:(503) 821-1147 E-mail: rachelle.barrett@oit.edu

Office Hours: 4pm-7pm M-F. Because of the geographic distance between each externship student and the MLS Program, it is expected that most communications will be conducted electronically or by phone/zoom.

Course Description: Third of three courses covering essential professional practice issues related to the pre-analytical, analytical, and post-analytical components of laboratory services. Emphasis on practical experience through the application of theories and concepts of professional development, administration and supervision at an approved off-campus clinical site.

Prerequisites: MLS 432 and MLS 462
CRN: 10716 **Credit Hours:** 1

Externship Location: Each student will have an assigned externship site which is selected by the MLS Program Clinical Coordinator. Students are responsible for the coordination of all activities with the site supervisor.

Instruction Format
The Foundations of MLS III clinical experience is innately student-centered and structurally fluid. It is anticipated that students will work independently to complete tasks on the checklist possible and work with the administrative staff at the clinical site to schedule items as necessary. Tasks on the checklist should be completed throughout the externship rotation as time permits.

During the externship, it is expected that students will be engaged in any of the following activities:

- One-on-one and small group discussion
- Attendance at meetings (e.g., lab staff meeting, committee meeting, etc.)
- Demonstrations and simulations
- Shadowing in lab related departments (phlebotomy, flow cytometry, etc.)
- Written reflections
- Reading of policies

The clinical externship experience for foundations should focus on workflow observations specific to administration, quality, and specimen management. Several of the required learning activities can be completed through reading and conducting of interviews that do not require students to be on site for completion.

Course Goals and Learning Objectives

The educational goals of MLS 463 Foundations III course are:

- Students will engage in activities that give them insight to and appreciation for medical laboratory **administration** and supervision.
- Students will engage in activities that give them insight to and appreciation for laboratory **operations**.
- Students will engage in professional communications.
- Students will demonstrate competency in and respect for pre-analytical departments of the laboratory.

It is the expectation that by the end of this course students should be able to complete the following assignments to the standards described by the course goal, program goal and university goal they are aligned to:

University Goal	Program Goal	Course Goal	Assignment
Demonstrate Proficiency with Inquiry & Analysis	Demonstrate Proficiency to problem-solve, troubleshoot, and interpret results, and to use statistical approaches when evaluating data.	Recognize how operations policies impact workflow within the laboratory.	Completed checklist.
Demonstrate proficiency with Teamwork	Demonstrate maintaining appropriate composure during stressful situations.	Work effectively and contributed toward the laboratory team.	Participated in Sim lab or professional growth opportunity.
Demonstrate proficiency with communication.	Demonstrate effective communication skills to ensure accurate and appropriate information transfer.	Communicate in a manner sufficient to serve the needs of the patient, public, and members of the healthcare team.	Made a phone call or interviewed someone.
	Demonstrate Administrative skills consistent with philosophies of quality assurance, continuous quality improvement, laboratory education, fiscal resource management.	Apply knowledge and skills learned during subject specific coursework to the administrative and supervisory duties conducted within the laboratory department.	Reviewed an SOP
	Application of safety and governmental regulations and standards as applied to medical laboratory practice.	Adhere to established safety policies and practices to minimize injury to self or others.	Safety training or Inspection readiness

Academic Integrity:

The topic of academic integrity and cheating has been thoroughly covered in the MLS student handbook. Please be aware that all policies and protocols outlined therein are in full effect. A charge of cheating can have severe consequences

Course Grade

To successfully complete MLS 463 Foundations III with a grade of C or better, students must:

- Complete 12 of the possible tasks on the **checklist**. At least 1 in each category of Laboratory Operations, Professional Conduct and Development, and Administration and Supervision.
- Have participated actively in the **Simulated Laboratory Experience** on campus.
- Return all required **documentation** to the instructor by the designated end of the clinical rotation.

Grade Element	Weighted Value (%)
Completing 12 activities	60
Simulated Laboratory Participation	35
Foundations Course Survey	5
TOTAL*	100

Grading Scale:
100-92% = A; 91-82% = B; 81-75% = C; 74-60% = D;<60% = F

Failure to Pass the Foundations III Course

If a student fails the course they will be given the opportunity to remediate the deficiencies in performance. The type and length of mediation will be determined on a case by case basis by the instructor. A corrective action plan will be written.
The timing of the remediation will be dependent on the clinical site space and availability. This may result in a *delay* of graduation.

If a student fails to successfully remediate per the requirement of the corrective action plan, the case will be referred to the program Progress and Promotion Committee for resolution. The student may be dismissed from the program.

Due Dates:

The completed competency checklist and all accompanying documentation and the student evaluation of the externship site are all **due by Noon on the final day of the rotation, Wednesday in December** before graduation**.**

Foundations of Clinical Laboratory Science III
Clinical Experience, Achievement, Learning Gains Checklist

Use this form to document a student's clinical experience participation, achievement, & learning gains in: 1) laboratory operations; 2) the principles and practices of professional conduct and professional development; and 3) administration and supervision as applied to clinical laboratory science.

Directions:

- The expectation is that a student will complete a minimum of 12 of the listed items on the checklist within the time of the externship experience.
  - The student must do at least 1 activity in each category.
  - Include all documented evidence as requested by the tasks.
  - For any activities requiring a witness, include responsible party's initials.
- It is the student's responsibility to make sure all pages of this form are **completed** and **returned** to course faculty, no later than the designated end of externship. *Items recorded in the "other" category should be approved by the instructor.*
- Complete the following Site survey to receive credit for 1 task on the list for Administration/Supervision. Record a date of completion in #1.

Site Survey

Type of LIS _____ Date it was implemented or last validated: _____

Computer Program used for Document Control_____

Accrediting Agency _____ Date of most recent inspection _____

Next Analyzer to be replaced _____

Lab Director Name _____ Medical Director Name _____

POC Manager Name _____ LIS Manager Name_____

Scheduler Name _____ Offshift Supervisor(s) _____

Foundations of Clinical Laboratory Science III
Checklist: Laboratory Operations, Professional Conduct, Administration and Supervision

Student Name: _____

Clinical Site: _____ **Rotation Dates:** _____

Laboratory Operations	**Date**	**Instructor Initials**
1. Perform phlebotomy on a minimum of 5 people.		
2. Shadow a phlebotomist for a site specified time or shift.		
3. Observe a person in the Specimen process department. Draw a spaghetti diagram of a typical workflow.		
4. Complete a laboratory safety training module.		
5. Learn to use a fire extinguisher appropriately.		
5. Follow a specimen from collection to storage through the lab. Provide either a description of its path, or a pictoral representation.		
6. Review the laboratory or department supplies/inventory ordering process. Provide a description or pictoral representation of this process.		
7. Assist with validation studies/linearity/correlation		
8. Update an SOP. Provide the before and after your suggested corrections. *Note: you do not have to request that your edits be utilized.*		
9. Experience capital equipment request process or meeting with vendor.		
10. Participate in Inspection readiness activities.		
11. Review or discuss with a supervisor previous inspection results summary.		
12. Review waste disposal policy at your site. Provide a description or pictoral representation of this process.		
13. Review document control policy at your site. Provide a paragraph description or figure of this process.		
14. Review Downtime Procedures. Provide a paragraph or pictoral representation of this process.		
15. Other (describe):		

Professional Conduct and Development	**Date**	**Instructor Initials**
1. Review an employee conduct policy at the site (suggestions: corrective action, appearance, vacation request, employee conduct) Write a paragraph about what you found unique or surprising about the policy at this site.		
2. Attend Grand Rounds or Case Study Session		
3. Join a professional organization. List your member ID # _____		
4. Participate in a learning activity that provides PACE credit. Provide a copy of the PACE certificate.		
5. Attend a lab staff meeting		
6. Attend an inter-department meeting		
7. Place or answer a professionally required call to another department outside of the laboratory. (example: clarification of order, critical value)		

Subject of call:		
9. Review the process at your site for patient interaction. Write a paragraph about what you found unique or surprising about the policy at this site.		
10. Work an alternative shift (evenings, nights or weekend) to observe how workflow is different.		
11. Attend professional networking event, conference or vendor fair		
12. Other (describe):		
13. Other (describe):		
Administration and Supervision	**Date**	**Instructor Initials**
1. Complete the Site Survey.		
2. Interview or Shadow the Medical Director or a Pathologist advisor. Provide a written account of questions and answers.		
3. Interview or Shadow a Laboratory Manager or Supervisor. Provide a written account of questions and answers.		
4. Interview or Shadow the Point of Care Coordinator. Provide a written account of questions and answers.		
5. Interview or shadow the LIS specialist. Provide a written account of questions and answers.		
6. Interview or shadow a department head/lead for a hospital department outside of the laboratory. Provide a written account of questions and answers.		
7. Interview or shadow a person in the Quality Department. Provide a written account of questions and answers.		
8. Review proficiency testing program. Map the process from specimen receipt to result.		
9. Review competency program. Provide evidence of your own competency performance according to their worksheets or policy.		
10. Review the Quality Program or attend a Quality Meeting. Provide a paragraph of what you learned.		
11. Discuss the annual appraisal process with a supervisor. Map the process.		
12. Discuss scheduling process or policies with the scheduling manager or supervisor.		
13. Interview a phlebotomist. Provide a written account of questions and answers.		
14. Interview someone from a different discipline (A&P, nursing, pharmacy). Provide a written account of questions and answers.		
15. Other (describe):		
16. Other (describe):		