

_____ College
_____ Department
Medical Laboratory Technology

COURSE: MLT _____ Introduction to MLT

CREDITS: 1 CLASS HOURS PER WEEK: 1 PREREQUISITES: Admission to MLT Program

DESCRIPTION OF COURSE

This course will provide an in-depth examination of the role and responsibilities of the Medical Laboratory Technician as an important professional in the delivery of quality health care. Discussions will include such topics as: quality assurance, the general organization, operational activities of a clinical laboratory, and career opportunities for MLT graduates. In addition, students will be introduced to specimen collection and processing techniques, equipment used in the clinical laboratory, safety policies and procedures, and the application of laboratory mathematics.

STUDENT LEARNING OUTCOMES

Upon completion of this course the students should be able to:

1. Discuss and apply concepts of quality assurance within the laboratory.
2. Describe the role, responsibility and career development of and opportunities for the MLT graduate.
3. Develop an understanding of the clinical laboratory and the relationships within the hospital setting.
4. Discuss and apply the knowledge and skills required to maintain a safe working environment.
5. Identify and describe the major components of the Code of Ethics of the American Society for Clinical Laboratory Science.
6. Apply knowledge and skills of specimen collection and processing.
7. Use math calculations as they apply to the laboratory.
8. Perform common metric conversions used in the laboratory.
9. Discuss the different governing and regulatory agencies involved in the medical laboratory technology profession.
10. Identify and describe the organizations associated with the following initials: ASCLS, ASCP, MT/CLS, MLT/ CLT, NCA, NAACLS, JCAHO, CAP, CLIA, and OSHA.
11. Demonstrate the ability to use basic clinical laboratory equipment and instrumentation including but not limited to: pipetting, microscopy, and spectrophotometry.
12. Demonstrate appropriate interpersonal communication skills and other professional behaviors outlined in the Student Handbook.

GENERAL EDUCATION OUTCOMES

_____ College's general education outcomes are an integral part of the curriculum and central to the mission of the college. The faculty at _____ has determined that these outcomes include the following competencies:

- Critical Thinking
- Effective Communication
- Community and Civic Responsibility
- Quantitative Literacy
- Scientific and Technological Effectiveness
- Information Literacy

COURSE MATERIALS REQUIRED

- All course materials are available through Blackboard online

TEXTBOOK, MANUALS, REFERENCES, AND OTHER READINGS

- *Introduction to MLT Study Guide*, Available Online, **Required**
- *Bloodborne and Airborne Pathogens, 2nd edition*, National Safety Council, ISBN: 978-0-07-38288-3, Available at the _____ Bookstore, **Required**
- *Phlebotomy Worktext and Procedures Manual, 2007, 2nd edition*, Saunders, Robin S. Warekois, Richard Robinson, ISBN: 978-1-4160-0035-8, **Highly Recommended**
- *Essential Laboratory Mathematics, 2010, 2nd Edition*, Thomson, Catherine W. Johnson, ISBN: 978-1-57766-660-8, **Highly Recommended**

GENERAL INSTRUCTIONAL METHODS

- Lectures
- Discussions
- Interactive online Study Tools
- Online Self-Assessments
- External link to Med Lab Training Site: www._____ This site provides multiple tutorials to facilitate learning.

ASSESSMENT

_____ College is committed to assessment (measurement) of student achievement of academic outcomes. This process addresses the issues of what you need to learn in your program of study and if you are learning what you need to learn. The assessment program at _____ State has four specific and interrelated purposes: (1) to improve student academic achievements; (2) to improve teaching strategies; (3) to document successes and

identify opportunities for program improvement; (4) to provide evidence for institutional effectiveness. In class you are assessed and graded on your achievement of the outcomes for this course. You may also be required to participate in broader assessment activities.

STANDARDS AND METHODS FOR EVALUATION

MLT 120 Grading: Students are required to achieve 75% or better to pass the course.

6 quizzes worth 25 points each	= 150 points
Final Exam	= 50 points
Total course points	= 200 points

GRADING SCALE

93% or greater	= "A"
85% - 92%	= "B"
75% - 84%	= "C"
70% - 74%	= "D"
Less than 70%	= "E"

Online Quiz and Exam Testing Policies

- 1. On Campus Students:** Quizzes and Exams will be given online in the College _____ Center, _____ Hall, Room _____. The _____ Center is open Monday through Thursday 9:00 am to 8:00 pm, Fridays & Saturdays 9:00 to 4:30 pm & closed on Sunday. Please note that exams will not be administered one hour prior to closing. 1 missed quiz may be made up for a 20% deduction. Requests to make up a missed quiz must be made in writing to the instructor within 48 hours of the scheduled due date. A second missed quiz will be assessed a zero grade. **Refresher Course Students:** Quizzes and final exam may be taken off-campus.
- 2.** If the final exam is not taken at the regularly scheduled time, an incomplete will be given. Incompletes will be made up during the first 6 weeks of the next semester, and the exam will be worth 80% of the original points possible.
- 3.** Online quizzes will be timed (30 minutes). Students are NOT allowed to use any notes or other resources when completing graded quizzes. Quizzes require a password that will be provided when signing into the testing center. Online quizzes can be found under "Assignments" folder on Blackboard and will be administered by the _____ Center in _____ Hall. Any attempt to access a quiz outside of the _____ Center or proctored setting will result in a zero for a score.

4. Students are NOT allowed to use any notes, printed or online resources when taking graded quizzes or exams. Any attempt to access or use any resources will result in a zero for a score and possible disciplinary action.
5. All quizzes, midterms, and exams are the property of the department and they must be returned after review.

SPECIAL COURSE REQUIREMENTS

- Access to the internet. High speed cable access will be helpful Online course materials found on [www._____](#)
- Use of the _____ student email address is required for course communication

ATTENDANCE POLICY

Regular attendance (including online attendance) is an important part of the educational process. Poor attendance is a reflection of a student's attitude toward learning but more importantly in the student's interest in and commitment to the profession. Attendance is mandatory. If a student misses more than 20% of the graded assessments, he/she will receive a failing grade for the course and will be considered "non-attendance" when documenting attendance for financial aid reporting.

STUDENT CODE OF CONDUCT

As an enrolled student at _____ College, you have agreed to abide by the Student Code of Conduct as outlined in the Student Handbook. You should familiarize yourself with the student code. The _____ College expects you to exhibit high standards of academic integrity, respect and responsibility. Any confirmed incidence of misconduct, including plagiarism and other forms of cheating, will be treated seriously and in accordance with College Policy and Procedure _____.

AMERICANS WITH DISABILITIES ACT (ADA) POLICY

It is _____ policy to provide reasonable accommodations to students with documented disabilities. If you would like to request such accommodations because of physical, mental or learning disability, please contact the Department _____, 101 _____ Hall. _____ Campus students may also contact an advisor in the _____ Center, first floor _____ Hall. Ask for _____ Campus advising, or [www._____](#) for assistance.

INCLEMENT WEATHER OR OTHER EMERGENCIES (*optional wording*)

In the event of severe weather or other emergencies that could force the college to close or to cancel classes, such information will be broadcast on radio stations and television stations.

Students who reside in areas that fall under a Level III emergency should not attempt to drive to the college even if the college remains open.

Assignments due on a day the college is closed will be due the next scheduled class period. If an examination is scheduled for a day the campus is closed, the examination will be given on the next class day. If a laboratory is scheduled on the day the campus is closed, it will be made up at the next scheduled laboratory class. If necessary, laboratory make-up may be held on a Saturday. If a clinical is missed because of weather conditions: (*insert department policy*).

Students who miss a class because of weather-related problems with the class is held as scheduled are responsible for reading and other assignments as indicated in the syllabus. If a laboratory or examination is missed, contact me as soon as possible to determine how to make up the missed exam or lab. Remember! It is the student's responsibility to keep up with reading and other assignments when a scheduled class does not meet, whatever the reason.

In the event the college is forced to close during Final Examination Week, exams scheduled for the first missed date will be rescheduled for (date), in the same location at the same time scheduled. Exams scheduled for a second missed date will be rescheduled for _____. Thus, our final exam is scheduled for (date) at _____ o'clock. If the college is closed that day, the exam will be held on (date) at _____ o'clock. If our exam is the second day the college has been closed, the exam will be held on (date) at _____ o'clock.

FINANCIAL AID ATTENDANCE REPORTING

_____ State is required by federal law to verify the enrollment of students who participate in Federal Title IV student aid programs and/or who receive educational benefits through the Department of _____. It is the responsibility of the College to identify students who do not commence attendance or who stop attendance in any course for which they are registered and paid. Non-attendance is reported each semester by each instructor, and results in a student being administratively withdrawn from the class section. Please contact the Financial Aid Office for information regarding the impact of course withdrawals on financial aid eligibility.

UNITS OF INSTRUCTION

Summer _____ MLT _____: Introduction to MLT Lecture and Exam Schedule

All Quizzes will be available at the _____ Center from Thursday - Saturday of the week that it is posted.

Week	Topic:	Assignment	Quizzes and Exams
1	Safety Part 1	Review online material	No Quiz
2	Safety Part 2	Review online material	Quiz covering Safety
3	Specimen Collection and Processing Part 1	Review online material	No Quiz
4	Specimen Collection and Processing Part 2	Review online material	Quiz covering Specimen Collection and Processing
5	Basic Lab Instrumentation: Microscopy	Review online material	No Quiz
6	Basic Lab Instrumentation: Spectrophotometry	Review online material	No Quiz
7	Basic Lab Instrumentation: Pipetting and Glassware	Review online material	Quiz 2 covering Basic Lab Instrumentation
8	Lab Math	Review online material	No Quiz
9	Lab Math	Review online material	No Quiz
10	Lab Math	Review online material	Quiz covering Lab Math
11	Quality Control and Assurance Part 1	Review online material	No Quiz
12	Quality Control and Assurance Part 2	Review online material	No Quiz
13	Lab Math in QC	Review online material	Quiz covering QC
14	Careers in Laboratory Medicine	Review online material	Quiz covering Careers in Laboratory Medicine
15	Laboratory Organization	Review online material	Quiz covering the Lab Organization
Finals	Good Luck on your Final Lecture	Review online material	Final Exam covering all topics

Week	Exam!	Available at the Testing Center			
WEEK	UNIT OF INSTRUCTION	LEARNING OBJECTIVES/GOALS	ASSESSMENT METHODS	ASSIGNMENTS	ASSIGNMENT DUE DATE
Weeks 1 and 2	Safety	<p>For each hazard classification, identify: state definition, sources of hazard, safety protocol, and the necessary safety equipment.</p> <p>Define the term “universal precautions”.</p> <p>Identify the two primary blood borne pathogens that they are meant to prevent.</p> <p>Apply universal precaution procedures for a given situation.</p> <p>Determine the appropriate selection of barriers in a given situation.</p> <p>Explain how to disinfect an area where a biohazardous spill has occurred.</p> <p>Explain the appropriate method of disposal of biohazardous materials.</p> <p>Explain and provide examples (where appropriate) of the following relative to OSHA’s Bloodborne Pathogen Standard: engineering controls, work practice controls, personal protective equipment, housekeeping, vaccine, exposure reporting, and post exposure plan.</p>	<p>Ungraded Self-Assessments</p> <p>Graded Quiz</p>	<p>Review Study Guide and online topic materials</p> <p>Complete online Study Tools</p> <p>Complete Online Self-Assessments</p> <p>Review Med Lab Training Site Tutorials and do quiz at end of topic</p>	Per course schedule

		<p>Explain the following, as each relates to fire classification: classes, nature of combustible, including examples, and appropriate extinguisher.</p> <p>Explain the following, relative to chemical hazards: classes, appropriate storage, and appropriate handling of spills.</p> <p>Explain the purpose, use and contents of an MSDS.</p> <p>List appropriate safe laboratory practices. Identify the key elements of: biohazards, fire hazards, electrical hazards, and chemical hazards.</p>			
Week 3 -15	Specimen Collection and Processing	<p>Describe how to safely perform a venipuncture using the evacuated tube system.</p> <p>Identify equipment used in venipunctures and capillary punctures.</p> <p>Explain methods of blood collection by venipuncture.</p> <p>Identify reasons for which capillary punctures are performed.</p> <p>List common anticoagulants used in collecting</p>	<p>Ungraded Self-Assessments</p> <p>Graded Quiz</p>	<p>Review Study Guide and online topic materials</p> <p>Complete online Study Tools</p> <p>Complete Online Self-Assessments</p> <p>Review Med Lab Training Site Tutorials and do</p>	<p>Per course schedule</p>

		<p>blood for laboratory testing.</p> <p>List the correct order of drawing multiple evacuated tubes by venipuncture.</p> <p>Define terms related to blood collection: vacuum tube, additive, anticoagulant, preservative, whole blood, serum, plasma, evacuated tube system, accessioning, syringe system, butterfly system. Laboratory Instrumentation and Equipment</p> <p>Identify contents, action, and uses of the following vacuum tube: clot, sodium citrate, EDTA, heparin, sodium fluoride, serum separator, SPS.</p> <p>Identify appropriate sites for collection by venipuncture and capillary puncture.</p> <p>For the following unique situations, identify the appropriate course of action for collecting blood: IV therapy, edematous patients, oncology patients, isolation, mastectomy patients, dialysis patients, geriatric patients, syncope, and combative patients.</p> <p>Identify complications of venipuncture and their appropriate resolution.</p> <p>Identify abnormal appearing plasma/serum</p>		<p>quiz at end of topic</p>	
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		<p>specimens: icteric, hemolyzed, and lipemic.</p> <p>Discuss legal complications related to blood collection: assault and battery, invasion of privacy, malpractice, negligence. Laboratory Mathematics</p> <p>Explain methods of blood specimen processing procedures.</p> <p>Explain the appropriate procedure when collecting the following specimens: blood culture, type and crossmatch, glucose tolerance, cold agglutinins, and fasting specimens. Explain the problems associated with these unacceptable specimens: QNS, incorrect anticoagulant to blood ratio, wrong anticoagulant, exposure to air, hemolysis, and specimens not kept on ice.</p> <p>Discuss the problems associated with these unacceptable specimens: QNS, Incorrect anticoagulant: blood ratio, wrong anticoagulant, exposure to air, hemolysis, and specimens not properly stored.</p>			
Week 5-7	Basic Laboratory Equipment and	<p>Identify the parts of the light optical microscope.</p> <p>State the function of each (but not limited to) the following microscope parts: condenser, iris</p>	Ungraded Self-Assessments Graded Quiz	Review Study Guide and online topic materials	Per course schedule

	Instrumentation	<p>diaphragm, prism, coarse and fine adjustment, stage.</p> <p>List the steps in focusing a specimen under various objectives.</p> <p>Recommend safety precautions to protect the microscope from damage.</p> <p>Identify the causes and remedies of common microscope problems.</p> <p>Calculate the total magnification produced when using a 10X ocular and/or 40X objective on a light microscope.</p> <p>Identify common laboratory glassware; e.g. pipettes, flasks, beakers, cylinders.</p> <p>Identify the appropriate pipette to use for a variety of dilution situations.</p> <p>State the proper use of a “to contain” and “to deliver” and “to deliver/blow out” pipettes.</p> <p>Identify the parts of a spectrophotometer.</p> <p>State the function of each part of the spectrophotometer.</p>		<p>Complete online Study Tools</p> <p>Complete Online Self-Assessments</p>	
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		<p>Correlate the absorption to concentration as it applies to spectrophotometric procedures.</p> <p>Identify the wavelengths in the ultraviolet region.</p> <p>Identify the wavelengths of light that are visible to the unaided eye.</p>			
Week 8-10	Laboratory Mathematics	<p>Solve the following types of math problems with accuracy: mean, median, mode, concentration volume, percent calculations, solution dilutions, metric conversions, ratio dilutions, and temperature conversions.</p> <p>Calculate a standard deviation and coefficient of variation.</p> <p>Apply calculations listed above to various laboratory situations.</p>	<p>Ungraded Self-Assessments Graded Quiz</p>	<p>Review Study Guide and online topic materials</p> <p>Complete online Study Tools</p> <p>Complete Online Self-Assessments</p>	Per course schedule
Week 11-13	Quality Control and Assurance	<p>Define terms associated with quality assurance and quality control.</p> <p>Calculate a standard deviation and coefficient of variation with accuracy.</p> <p>Determine confidence limits of a given assay.</p> <p>Identify and give examples of the components of</p>	<p>Ungraded Self-Assessments Graded Quiz</p>	<p>Review Study Guide and online topic materials</p> <p>Complete online Study Tools</p> <p>Complete Online Self-Assessments</p>	

		<p>a quality assurance system.</p> <p>Identify requirements of a control sample.</p> <p>Explain the quality control process from the point of establishing Q.C. limits to the evaluation of data.</p> <p>Analyze quality control data for random and systematic errors.</p> <p>Explain and apply the Westgard Rules and evaluate data for violations of the rules.</p> <p>Explain the purposes of various types of external monitoring of a laboratory's work.</p> <p>Evaluate the validity of patient test results when provided specific quality control data.</p>			
Week 14	Laboratory Organization	<p>Identify the relationship of the laboratory in the hospital organizational structure: Board of trustees, Hospital Administrator, Ancillary Department, Laboratory. Laboratory Director, Anatomic Laboratory, and Clinical Laboratory.</p> <p>Identify the function, instrumentation, and common tests performed in each laboratory department: Hematology, Immunochemistry,</p>	<p>Ungraded Self-Assessments</p> <p>Graded Quiz</p>	<p>Review Study Guide and online topic materials</p> <p>Complete online Study Tools</p> <p>Complete Online Self-Assessments</p>	<p>Per course schedule</p>

		<p>Microbiology, Body Fluids, Immunology, and Clinical Chemistry.</p> <p>Explain the relationships of the personnel involved in patient care: Attending physician, Pathologist, Department supervisors, Lead Technologists, and Bench Technicians.</p> <p>Compare the tasks performed by the generalist and specialist laboratory practitioners.</p> <p>Explain how the results of laboratory tests are utilized.</p> <p>Identify characteristics of an effective screening test.</p> <p>Distinguish diagnostic sensitivity and diagnostic specificity.</p> <p>Identify the major components of a Code of Medical Ethics.</p> <p>Identify and describe the organizations associated with each of the following initials: NCCLS, CLIA, CMS, JCAHO, CDC, OSHA, ASCLS, ASCP, NCA, NAACLS, CAP, and CLIA.</p> <p>Identify the each of the following certifications: MT/CLS, MLT/CLT, SH, SM, SBB.</p>			
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		Describe the various governing groups and agencies involved in the Clinical Laboratory Science profession.			
Week 15	Careers in Laboratory Medicine	<p>Identify levels of certification within the Clinical Laboratory Sciences profession.</p> <p>Identify settings in which an MLT would be qualified for employment.</p> <p>Explain the differences between the terms certification, licensure, registration and accreditation.</p>	<p>Ungraded Self-Assessments</p> <p>Graded Quiz</p>	<p>Review Study Guide and online topic materials</p> <p>Complete online Study Tools</p> <p>Complete Online Self-Assessments</p> <p>Review Med Lab Training Site Tutorials and do quiz at end of topic</p>	Per course schedule
Week 16	Finals Week		<p>Ungraded Self-Assessments</p> <p>Graded Quiz</p>	Review Study Guide and online topic materials	Per course schedule

Semester Course Syllabus rev 031411 [1] Redacted 3.18.15.bc