**_____College**
**_____Department**
**Medical Laboratory Technology**

**COURSE: MLT _____Introduction to MLT Laboratory**

**CREDITS: 1 CLASS HOURS PER WEEK: 2 PREREQUISITES: Admission to MLT Program**

**DESCRIPTION OF COURSE**

This course provides lab component to complement MLT _____. Students will have an opportunity to visit a clinical laboratory and meet with practicing laboratory personnel. Students will be introduced to specimen collection and processing procedures, principles of math, quality assurance, safety and the laboratory operational activities.

**STUDENT LEARNING OUTCOMES**

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

- Discuss and apply concepts of quality assurance within the laboratory.
- Discuss and apply the knowledge and skills required to maintain a safe working environment.
- Apply knowledge and skills of specimen collection and processing.
- Use math calculations as they apply to the laboratory.
- Apply the Code of Medical Ethics to selected situations in the clinical laboratory.
- Perform a successful venipuncture.
- Perform common metric conversions used in the laboratory.
- Discuss the different governing and regulatory agencies involved in the medical laboratory technology profession.
- Demonstrate the ability to use basic clinical laboratory equipment and instrumentation including but not limited to: pipetting, microscopy, and spectrophotometry.
- 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 _____have 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**

- Study Guide
- Online course materials found on www._____
- Discussions
- Laboratory demonstration and practice
- Observations
- Laboratory activities and assignments
- 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 _____ 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 _____ Grading: Students are required to achieve 75% or better to pass the course.**
***Please note: The point distribution may be subject to change.***

| Topic | Anticipated Points |
|---|---|
| Venipuncture Checklists: | 20 points |
| Spec. Collection & Processing: | 25 points |
| Basic Lab Instrumentation | 25 points |
| Math: | 25 points |
| QC: | 25 points |
| Safety, Lab Org, | 25 points |
| Careers in Med and Lab Tour | 5 points |
| Final Practical | 50 points |
| **Total =** | **200 points** |

| | | |
|---|---|---|
| 93-100% | 186 points – 200 points | A |
| 85-92% | 170 points – 185 points | B |
| 75-84% | 150 point – 169 points | C |
| 70-74% | 140 points -149 points | D |
| < 70% | Less than 140 points | E |

**Late Assignments:**
Any assignment that is not turned in on time will be assessed a 20% point deduction. Any assignment more than one week late will be assessed a 50% point deduction.

**Testing/Grading Policies:**

1. All quizzes and exams are the property of the department and they must be returned after review.

2. 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. 1 graded lab exercise or practical exam may be made up for 80% of the possible points. Any subsequent missed lab exercises will be assessed 0 points. Requests to make up a graded laboratory exercise or exam must be made in writing to the instructor within 48 hours of the scheduled due date. The make-up exercise may be in the form of a written assignment at the discretion of the instructor if it laboratory reagents are no longer available,

3. A 5% penalty deduction will be deducted from graded laboratory exercises/exams when demonstrating a less than satisfactory professional behavior listed the MLT Grading Rubric.

4. Audible pagers and cell phones are not permitted during any classes. Please turn them off while in class.

**Attitudinal (Incorporated into Lab Grade): See MLT Laboratory Grading Rubric**

The following professional behaviors/attitudes will be assessed during the semester.

- Ability to Follow Directions
- Interest in work
- Cooperation
- Ability to Communicate
- Persistence
- Integrity
- Punctuality/Attendance
- Initiative
- Patience and Respect
- Flexibility
- Ability to Prioritize
- Judgment
- Organization

MLT Laboratory Grading Rubric

* 5% deducted for each non=professional attitude listed in Appendix 2 of the student handbook not exceeding 20%

| Assessment | % Worth | Point Worth | Total Points |
|---|---|---|---|
| Laboratory Exercise Total Point Worth | 100% | | |
| Attitudinal Evaluation<br>__ Ability to follow directions<br>___ Interest in Work<br>___ Cooperation<br>___ Ability to Communicate<br>___ Persistence<br>___ Integrity<br>___ Punctuality/Attendance<br>___ Initiative<br>___ Patience & Respect<br>___ Flexibility<br>___ Ability to Prioritize<br>___ Judgment<br>___ Organization | up to 20% * | | |

**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:**

1. Attendance is mandatory. Laboratory instructions will be given and attendance will be taken promptly at the scheduled laboratory time. 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.

2. Frequent absences, tardiness and immature behavior are disruptive to the educational process and place an unfair burden on faculty and fellow students. Please note that it is impossible to recommend anyone for a job who is frequently late and/or absent and this type of behavior will jeopardize the student placement in clinical experience. Laboratory instructions will be given and attendance will be taken at the beginning of the class. A *5% penalty will be deducted from the Final Exam score if the student is tardy 2 or more times or has an unexcused absence. Tardy is defined as being 10 or more minutes late for class. An additional 2% will be deducted for each tardy occurrence exceeding 2. An additional 5% will be deducted from the Final Exam score for each subsequent unexcused absence. Please note: Illness without a written doctor's excuse advising you do not attend class is considered an unexcused absence.*

**Laboratory Rules:**

1. Adhere to all policies outlined in the student handbook.

2. Handle all laboratory specimens and reagents as if contaminated and follow universal precautions as outlined in the student handbook. Gloves and lab coats are required.

3. Eating, drinking, and application of cosmetics or lip balm is not allowed. Gum chewing is similar to eating and is also not allowed.

4. Hair must be pulled back away from the face and of the shoulders.

5. Dispose of all contaminated material in biohazard containers provided.

6. Keep work area neat and clean.

7. Wipe countertops with disinfectant (10% bleach) before leaving the laboratory.

8. OSHA regulations must be followed:

    a. Use standard precautions at all times

b. Use personal protective equipment
    - disposable, fluid impermeable lab coat
    - gloves whenever working with biological specimens
    - face protectors or mask as needed, such as isolation or fingersticks

c. Follow established work practice controls
    - do not recap needles
    - use sharps containers
    - dispose of contaminated material in biohazard containers

9. Frequently wash hands when performing laboratory exercises and always wash hands prior to leaving the laboratory.

10. Determine the location of all safety equipment in the laboratory (eyewash, shower, fire extinguisher, etc).

11. Maintain a professional and courteous conduct at all times.

12. Work independently.

**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 _____Services, 101 _____Hall. _____Campus students may also contact an advisor in the Student Services 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 _____Office for information regarding the impact of course withdrawals on financial aid eligibility.

**UNITS OF INSTRUCTION** **MLT _____: Intro to MLT Laboratory Schedule**

| Week | Topic | Lab Exercises and Quizzes |
|---|---|---|
| 1-2 | Safety Parts 1 and 2 | 1. Program Overview/Policies and Course Expectations<br>2. Safety Discussion and Safety Activity<br>3. MSDS Assignment |
| 3 | Specimen Collection and Processing Part 1 | 1. Capillary Fingerstick Demonstration and practice on each other<br>2. Demonstrate venipuncture procedure<br>3 Practice venipunctures on artificial arms<br>4 Med Lab Training Website Venipuncture assignment |
| 4 | Specimen Collection and Processing Part 2 | 1. Graded quiz on Bloodborne Pathogen booklet assignment<br>2. Practice venipunctures on artificial arms.<br>3. Begin check-off on artificial arms using the checklist |
| 5 | Basic Lab Instrumentation | 1. Basic Lab Instrumentation Activities: Microscope, Centrifuge, Scales<br>2. Practice venipunctures on artificial arms Complete check-off on artificial arms using the checklist.<br>3. Quiz on Med Lab Training Website Venipuncture Tutorials |
| 6-7 | Basic Lab Instrumentation | 1. Basic Lab Instrumentation Activities: Pipetting and Spectrophotometry<br>2. Begin performing venipunctures on other students using checklist. (1st attempt is not graded) |
| 8-10 | Lab Math | 1. Practice math problems (ungraded)<br>2. Practice Preparing Dilutions & Solutions<br>3. Continue performing venipunctures on other students using checklist. (1st attempt is not graded) |
| 11 -12 | Quality Control Part 1 | 1. Graded Lab Math Quiz<br>2. Practice L-J exercises.<br>3. Perform venipunctures on other students using checklist. |
| 13 | Quality Control Part 2 | 1. Graded L-J exercise<br>2. Practice misc lab skills ( Ex: pipetting)<br>3. Perform venipunctures on other students using checklist. |

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| 14 | | 1. Lab Tour (Tentative Date) |
| 15 | Laboratory Organization, Careers in Lab Medicine | 1. Lab Tour Essay Due<br>2. HIPAA, Lab Org Activity, HIPAA Assignment Due |
| 16 | Final Exam and Last Opportunity to Complete Venipunctures | |

***Please note: Although we try to stay on task, the schedule is subject to change.***

**Units of Instruction**

| WEEK | UNIT OF INSTRUCTION | LEARNING OBJECTIVES/GOALS | ASSESSMENT METHODS | ASSIGNMENTS | ASSIGNMENT DUE DATE |
|---|---|---|---|---|---|
| **Weeks 1-2** | **Safety** | For each hazard classification, identify: state definition, sources of hazard, safety protocol, and the necessary safety equipment.<br><br>Define the term "universal precautions".<br><br>Demonstrate appropriate universal precautions procedures in the laboratory.<br><br>Apply universal precautions for a given situation.<br><br>Determine the appropriate selection of barriers in a given situation.<br><br>Demonstrate and explain how to disinfect an area where a biohazardous spill has occurred.<br><br>Demonstrate appropriate methods of disposal of biohazardous materials.<br>Explain the following, as each relates to fire classification: classes, nature of combustible, including examples, and appropriate extinguisher.<br><br>Explain the following, relative to chemical hazards: classes, appropriate storage, and | Ungraded Self-Assessment Activities<br><br>Graded activity and quiz | Study Guide<br><br>Online course materials<br><br>Discussions<br><br>Interactive online Study Tools<br><br>Online Self-Assessments<br><br>External link to Med Lab<br><br>Laboratory activities and assignments<br><br>Training Site Tutorials and quiz at end of topic | Per course schedule |

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| | | appropriate handling of spills.<br><br>Explain the purpose, use and contents of an MSDS.<br><br>Use MSDS to determine appropriate safe laboratory practices.<br><br>Demonstrate and apply appropriate safe laboratory practices.<br><br>Identify key elements of: biohazards, fire hazards, electrical hazards, and chemical hazards.<br><br>Locate safety equipment and supplies in the student laboratory. | | Textbook Reading Assignment | |
| **Weeks 3-4** | **Specimen Collection and Processing** | Demonstrate the proper procedure for performing a venipuncture and capillary fingerstick<br><br>Perform a capillary fingerstick.<br><br>Safely perform the specified number of venipunctures using the evacuated tube system.<br><br>Assemble the appropriate equipment used in venipunctures and capillary punctures. | Ungraded Self-Assessment Activities<br><br>Graded observation checklist and quiz | Study Guide<br><br>Online course materials<br><br>Discussions<br><br>Interactive online Study Tools<br><br>Online Self- | Per course schedule |

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| | | Explain methods of blood collection by venipuncture.<br><br>Identify reasons for which capillary punctures are performed.<br><br>Choose appropriate sites for collection by venipuncture and capillary puncture.<br><br>Demonstrate the correct order of drawing multiple evacuated tubes by venipuncture when provided with a laboratory requisition.<br><br>Identify complications of venipuncture and their appropriate resolution.<br><br>Define terms related to blood collection: vacuum tube, additive, anticoagulant, preservative, whole blood, serum, plasma, Evacuated tube system, accessioning, syringe system, butterfly system.<br><br>Identify contents, action, and uses of the following vacuum tube: clot, sodium citrate, EDTA, heparin, sodium fluoride, serum separator, SPS.<br><br>Identify and choose appropriate sites for collection by venipuncture and capillary | | Assessments<br><br>External link to Med Lab<br><br>Laboratory demonstration and practice<br><br>Observations<br><br>Laboratory activities and assignments<br><br>Training Site Tutorials and quiz at end of topic | |

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| | | puncture.<br><br>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.<br><br>Perform basic specimen processing procedures, for example separating serum/plasma from red cells for appropriate storage requirements.<br><br>Describe the proper procedure for obtaining quality specimens for the lab (venous, arterial, and capillary).<br><br>Describe the proper procedures for processing whole blood specimens when serum or plasma is needed.<br><br>Identify the general storage requirements for routine laboratory tests.<br><br>Recognize abnormal appearing plasma/serum specimens: icteric, hemolyzed, and lipemic. | | | |
| **Weeks 5-7** | **Basic Laboratory Equipment and** | Demonstrate the ability to use the following, but not limited to, basic laboratory equipment: pipettes, scales, microscopes, and spectrophotometer. | Ungraded Self-Assessment Activities | Study Guide<br><br>Online course materials | Per course schedule |

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| | **Instrumentation** | Identify the parts of the light optical microscope (but not limited to) the condenser, iris diaphragm, prism, course and fine adjustment.<br><br>Identify the parts of a spectrophotometer.<br><br>State the function of each part of the spectrophotometer.<br><br>Demonstrate proper use of pipettes, e.g. MLA, volumetric, and serological.<br>Select the proper pipettes when given a specific pipetting laboratory exercise. | Graded activity and quiz | Discussions<br><br>Interactive online Study Tools<br><br>Online Self-Assessments<br><br>Laboratory demonstration and practice<br><br>Observations<br><br>Laboratory activities and assignments | |
| **Weeks 8-10** | **Laboratory Mathematics** | Solve the following types of math problems with accuracy: mean, median, mode, concentration volume, solution dilutions, metric conversions, ratio dilutions, and temperature conversions.<br><br>Calculate a standard deviation and coefficient of variation.<br><br>Apply calculations listed above to various laboratory situations. | Ungraded Self-Assessment Activities<br><br>Graded activity | Study Guide<br><br>Online course materials<br><br>Online Self-Assessments<br><br>Laboratory demonstration | Per course schedule |

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| | | | | and practice<br><br>Observations<br><br>Laboratory activities and assignments | |
| **Weeks 11-13** | **Quality Control and Assurance** | Define the terms associated with quality assurance and quality control.<br><br>Calculate a standard deviation and coefficient of variation with accuracy.<br><br>Determine confidence limits of a given assay.<br><br>Explain the quality control process from the point of establishing Q.C. limits to the evaluation of data.<br><br>Construct a Levey-Jennings chart.<br><br>Plot quality control data on a Levy-Jennings chart.<br><br>Analyze quality control date for random and systematic errors.<br><br>Apply the Westgard Rules and evaluate data for | Ungraded Self-Assessment Activities<br><br>Graded Levey-Jennings activity | Study Guide<br><br>Online course materials<br><br>Discussions<br><br>Interactive online Study Tools<br><br>Online Self-Assessments<br><br>Laboratory demonstration and practice<br><br>Laboratory activities and assignments | Per course schedule |

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| | | violations of the rules.<br><br>Evaluate the validity of patient test results when provided specific quality control data. | | | |
| **Weeks 14** | **Laboratory Organization** | Identify the functions of each laboratory department: Hematology, Immunohematology, Microbiology, Body Fluids, Immunology, and Clinical Chemistry.<br><br>Identify and explain common laboratory tests performed in each laboratory department.<br><br>Tour a local hospital clinical laboratory.<br><br>Compare the tasks performed by the generalist and specialist laboratory practitioners.<br><br>Apply the Code of ethics to selected situations in the Clinical Laboratory Science profession.<br><br>Demonstrate appropriate professional attitudes and behavior in the student laboratory.<br><br>Apply universal precaution guidelines in the student laboratory. | Lab Tour Essay | Study Guide<br><br>Online course materials<br><br>Online Self-Assessments<br><br>Laboratory activities and assignments<br><br>Lab Tour | Per course schedule |
| **Weeks 15** | **Careers in Laboratory Medicine** | Demonstrate appropriate professional attitudes and behavior in the student laboratory.<br><br>Apply universal precaution guidelines in the student laboratory. | Ungraded Self-Assessment Activities<br><br>Graded activity | Study Guide<br><br>Online course materials | Per course schedule |

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| | | | | Discussions<br><br>Online Self-Assessments<br><br>Laboratory activities and assignments | |
| **Week 16** | **Finals Week** | | Final Exam | | Per course schedule |

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