MLT-702: INTRODUCTION TO MEDICAL LABORATORY TECHNOLOGY

Effective Term
Fall 2024

BOT Approval Date
12/14/2023

Discipline
MLT - Medical Laboratory Technician

Course Number
702

Course Title
Introduction to Medical Laboratory Technology

Short Title
Intro to MLT

Credit Status (CB 04)
D - Credit - Degree applicable

Units

Lecture Units
3.00

Total Units
3

Hours

Lecture Contact Hours
48-54

Out of Class Hours Lecture
96-108

Total Contact Hours
48 - 54

Total Out of Class Hours
96 - 108

Total Student Learning Hours
144 - 162

Distance Education
Yes

Distance Education

Distance Education Type
Both Fully Online and Hybrid Online

Fully Online Delivery Requirements:
a. Students must be notified via the college schedule of classes and the syllabus for the class if proctored tests are required for this course

b. Any planned face-to-face meetings, such as an orientation or study session, must be optional
c. The MSJC curriculum committee requires the use of accessible, asynchronous discussion as a component of every fully online course

Are you using publisher content?

No

Regular Substantive Interaction

Instructor-to-student, student-to-student, and student-to-content contact shall be distributed in a manner that will ensure regular substantive interaction (RSI) is maintained not only weekly but also for the duration of the course. Instructor interactions should be equivalent in time, quality and consistency to the engagement students would receive in a face-to-face course—for example, through announcements, discussion participation, personalized feedback, video messages, or other instructional communications. Instructors are expected to be responsive to student inquiries within a 24-72 hour time frame excluding holidays. RSI will be maintained through a variety of methods: • Orientation - Students must be oriented to the online and face-to-face portions at the start of the course. • Announcements - Announcements using the course management system must be posted at least weekly to keep students current on course events, due dates, materials, etc. • Discussion Forums - Content-related discussion forums within the designated CMS will include appropriate instructor participation and will be initiated and maintained, with timely feedback provided. Instructors are required to monitor the discussions and related activities to provide guidance and direction. Open-ended discussion boards may be used to further learning and interaction. • MSJC Communication – Instructor will use MSJC-administered communication tools (such as email or the designated CMS communication tools) to regularly communicate with and provide ease of access to students. • Timely Feedback - Timely feedback on student work will be provided by the instructor, which may include comments and/or rubrics, within the Grades area of the designated CMS. • Scheduled Meetings – Hybrid and synchronous courses will meet at regularly scheduled times. ADA Compliance - All course interactions and content must be designed with accessibility in mind and meet ADA requirements.

Catalog Description

This course provides the basic foundational training for laboratory personnel working in the laboratory in medical offices, clinical and hospital settings. The course introduces students to a variety of laboratory techniques and equipment used in the clinical laboratory. Topics covered in this course include laboratory safety, specimen collection, processing and reporting, and procedures in chemistry, hematology, microbiology, serology, blood banking and urinalysis.

Attach Supporting Documents

11-1-21 CTE Deans Minutes.docx
MLT LMI 2020.pdf
Board Proposal for Associate Medical Lab Tech Degree.docx

Requisites

Pre or corequisite(s)

Prerequisite or corequisite(s) (must be taken simultaneously if not taken before)
MLT-701 (with a grade of C or better).

Recommended Preparation

Recommended Preparation (note that students can enroll in the class even if they haven't take the recommended course)
BIOL-100
CHEM-100
AH-105

Codes

TOP Code (CB 03)

1205.00* - *Medical Laboratory Technology

CIP Code

51.0802 - Clinical/Medical Laboratory Assistant.

Repeatability Code

No

Grading Option
Letter grade OR P/NP

Learning Objectives

Learning Objectives

Learning Objective
1. Discuss the organization and function of the clinical laboratory.
2. Validate the laboratory safety rules that mandated by OSHA, HIPAA and CDC to guard against chemical, physical and biological hazards.
3. Evaluate the role of quality assessment programs in the clinical laboratory.
4.Assess the function of the hematology laboratory and discuss the principles and procedures for the most common hematology tests.
5.Analyze the process involved in hemostasis and discuss the use of instrumentation in coagulation testing.
6.Determine how the principles of immunology are used in the clinical laboratory.
7.Design a process for proper urine collection and preservation and transportation.
8.Categorize frequently performed clinical chemistry tests/panels and assess the significance of each.
9. Formulate a possible correlation between culture, social, economic and environmental factor and patient care and treatment outcome.
10. Diagram a timeline outlining the contribution of various cultures to science, medicine and the instrumentation/mechanization of various laboratory tests.

Learning Outcome Information

Course Learning Outcomes

Learning Outcome
1. The student will accurately and safely perform laboratory tests that identify diseases associated with blood, blood forming tissues and body fluids.
2. The student will explain how clinical laboratories are regulated and discuss the ethical conduct for clinical laboratory personnel.
3. The student will assess safe work practices in the clinical laboratory.
4. The student will demonstrate the proper use, care, and maintenance of laboratory supplies and equipment.
5. The student will evaluate how collection procedures affect specimen quality, assessment and results.
6. The student will explain the principles of automated technology in the laboratory.
7. The student will demonstrate introductory knowledge of hematology, blood banking, coagulation, chemistry, serology, microbiology and urinalysis.
8. The student will develop cultural competency in providing equitable care in healthcare.
9. The student will stimulate curiosity and appreciation for diverse thought and expression.

Program Learning Outcomes

Learning Outcome
1. The student will demonstrate competency and understanding of the fundamental principles of laboratory procedures.
2. The student will adhere to HIPAA confidentiality guidelines in reporting accurate and timely patient test results.
3. The student will develop skills in providing the highest level of patient care as defined by established standards.
4. The student will apply critical thinking skills in conducting clinical laboratory tests and reporting results to the clinicians.
5. The student will acquire the knowledge and skills necessary to pass the licensing exam and enter the workforce as professional laboratory personnel.
6. The student will demonstrate cultural awareness in communicating with patients, patient's family, laboratory staff and clinicians.

Institutional Learning Outcomes
Communication: The student will effectively express and exchange ideas through listening, speaking, reading, writing, visual works, and other modes of interpersonal expression.

Critical Thinking: The student will analyze problems, gather and synthesize relevant information, evaluate ideas, information, and evaluate alternative points of view to create, innovate and implement effective solutions.
Cultural Awareness and Humility: The student will demonstrate knowledge of and sensitivity toward individuals of diverse ethnicity, age, gender, sexual orientation, and religious affiliations, as well as toward those individuals with diverse abilities and socio-economic classes to respectfully interact with individuals of diverse perspectives, beliefs and values while being mindful of the limitation of their own cultural frameworks.
Information and Technology Literacy: The student will access, interpret, evaluate, and apply relevant information sources and digital media effectively, and in an ethical and legal manner.
Scientific Awareness: The student will apply the scientific method of inquiry to assess potential solutions for real-life challenges by employing science-based knowledge and methodologies in daily life.
Social Awareness: The student will recognize and analyze the interconnectedness of global, national, and local concerns, analyzing cultural, political, social, and environmental issues from multiple perspectives and appreciate similarities and differences among cultures.
Personal
and Professional Responsibility
Civic

Content

Course Lecture Content

1. Introduction To Clinical Laboratory
a. Hospital laboratory
b. Physician office laboratory
c. Referene laboratory
d. Federal and State laboratories
e. Regulation of clinical laboratories
f. Quality assessment in the laboratory
g. Patient privacy and confidentiality
h. Medical terminology
i. Introduction to the metric system
j. Laboratory safety
2. Basic Hematology
a. Introduction to hematology
b. Hematocrit determination
c. Hemoglobin determination
d. The hemocytometer
e. Manual RBC and WBC count
f. Platelet count
g. Preparing and staining a blood smear
h. Normal and abnormal RBC morphology
i. Reticulocyte count
j. Erythrocyte sedimentation rate
k. Principles of automated hematology
3. Basic Hemostasis
a. Principles of hemostatis
b. Disorders of hemostasis
c. Bleeding Time
d. Prothrombin Time
e. Activated Partial Thromboplastin Time
f. Rapid hemostasis test
4. Basic Immunology and Immunohematology
a. Introduction to immunohematology
b. ABO blood grouping
c. Rh blood typing

d. Rapid test for infectious mononucleosis
e. Slide test for rheumatoid factors
5. Urinalysis
a. Introduction to urinalysis
b. collection and preservation of urine
c. Physical examination of urine
d. Chemical examination of urine
e. Microscopic examination of urine sediments
f. Urine hCG test
6. Basic Clinical Chemistry
a. Introduction to clinical chemistry
b. Specimen collection and processing for clinical chemistry
c. Chemistry instrumentation in the physician office laboratory
d. Point of care testing
e. Blood glucose and hemoglobin A1c testing
f. Blood cholesterol and Triglyceride testing
g. Electrolyte testing
7. Basic Clinical Microbiology
a. Introduction to clinical microbiology
b. Infection control and transmission based precautions
c. Emerging infectious diseases
d. Biological agents and bioterrorism
e. Culture techniques for bacteria
f. Gram staining principle and procedure
g. Rapid group A streptococcus test
h. Urine culture and colony count
i. Bacterial identification and antibiotic sensitivity
j. Laboratory detection of sexually transmitted diseases.
k. Fecal occult blood test.
8. Basic Parasitology
a. Introduction to parasitology
b. Collecting and processing specimen for parasite examination
c. Microscopic methods of detecting intestinal parasites
d. preparing and staining smears for blood parasites
9. Cultural Competency in Healthcare
    i. Cultural Perception of Health
    ii. Racial and ethnic discrepancies in healthcare
1. Access to preventative care
2. Treatment of chronic conditions
3. Emergency room visits
4. Health outcomes
5. Likelihood of developing
a. Cardiovascular disease
b. Diabetes
c. Cancer
d. Mental illness
6. Racial discrepancies in breast reconstruction surgery
iii. Social Determinant of Health
a. Housing quality

b. Access to healthy foods
c. Education
iv. Disparity reducing activities in healthcare
1. Culturally congruent care

Methods of Instruction

Method

Lecture

Integration

PowerPoint lectures, complimented with accessible audio visual materials in the form of video clips will be used to present key concepts and procedures. Lecture notes will be embedded with critical thinking questions related to laboratory test, techniques and safety protocols. In each module, students will be asked to examine inherent cultural or personal biases and discuss ways to implement protocols to ensure equity and respect of all cultures in the workplace.

DE Adaptations for MOI

Using accessible tools in the course management system (CMS), lecture notes will be accompanied by voice over input from the instructor, accessible audio visual presentations and demonstrations by the instructor, of various techniques and skills used in the clinical laboratory. The lecture materials will be presented via the course learning management system. Students will interact online, with the lectures notes by providing responses to critical thinking question in the lesson using the course managment system.

Method

Discussion

Integration

Students engagement in class discussion and provide written response to assigned questions that will be evaluated by the instructor based on an established rubric.
Students will engage in small and large group discussion to synthesize and analyze lecture material and case studies that include, for example, ways to avoid errors in pre-analytic sample collection, sample testing and post-analytic quality assessment of test results.

DE Adaptations for MOI

Using the accessible tools, discussion can be accessed using the course management system (CMS). Students will engage in class discussion online, using discussion boards, and provide written response to assigned questions.

Students will engage in small and large group discussion to synthesize and analyze lecture material and case studies that include, for example, ways to avoid errors in pre-analytic sample collection, sample testing and post-analytic quality assessment of test results.

Method

In-class Exercises

Integration

Case studies will be used to engage large and small group cooperative learning activities in discussing scenarios in the laboratory that include pre-analytic, analytic and post-analytic errors, and patient care. Students are encourage to be mindful and respectful of each other's opinion, cultural difference and valued individual experience.

In these case studies, students will examine cases of patients from different cultural background and pathologies and create solutions that considers the patient's own cultural background, ideologies, belief system and methods of dealing with illnesses, treatments and even naturopathic modalities.

DE Adaptations for MOI

Using accessible tools in the course management system students will access discussion case studies via the discussion boards. Discussion boards are used to encourage dialogue and interactive exchange of ideas between students. Break out rooms are used to create a similar setting for interaction in a synchronous manner. Students are encourage to be mindful and respectful of each other's opinion, cultural difference and valued individual experience.

Using the accessibel tools in the CMS, students will examine cases of patients from different cultural background and pathologies and create solutions that considers the patient's own cultural background, ideologies, belief system and methods of dealing with illnesses, treatments and even naturopathic modalities. Break out rooms and discussions will be created as a safe place for students to share their opinions, and interject their cultural beliefs and practice as it relates to illness, treatment plans, testing, cure and healing.

Method

Film/video Viewing and Discussion

Integration

Films and videos are used to provide insight in to the layout of the lab, instruments used in the lab and the interaction of personnel in the lab. Videos are carefully chosen to include lab personnel of various culture so that students can make cultural connections and feel included in the presented material. These video clips are accessible from the instructor material for the adopted textbook and are downloadable for student view.

DE Adaptations for MOI

Using the accessible tools in the course management system (CMS) students view videos individually and/or as a whole class group and discuss their opinions and insight into the functioning of a clinical lab and the need to be able to communicate effectively and sensitively to patients, staff and clinicians of various cultural background. These video clips are accessible from the instructor material for the adopted textbook and are downloadable to the course management system and made available to students in the course modules.

Method

Group Projects

Integration

Groups of students will select an instrument used in the laboratory and evaluate the design and use of the instrument. Students will also research the contribution of various cultures to the conception, design, implementation and use of the instrument.

DE Adaptations for MOI

Using the accessible tools in the course management system (CMS) students will meet online in their designated groups and select an instrument used in the laboratory and evaluate the design and use of the instrument. Students will also research the contribution of various cultures to the conception, design, implementation and use of the instrument. Students will work collaboratively to collect their findings and share with the class during a period dedicated for presentations.

Methods of Evaluation

Method

Exams/Tests

Integration

Tests/quizzes and exams will be administered at the end of each module and/or major concept, and will require critical analysis and synthesis of the information presented in the lecture material, textbook and audio visual presentations. Exams/Test will formatively cover major laboratory themes, departments, instrumentations and quality assurance measures, which align with the course learning objectives. The Exams/Tests will assess student's knowledge, understanding and application of clinical laboratory functioning, instrumentation, specimen collection and accurate testing and timely reporting of results.

DE Adaptations for MOE

Test, quizzes and exams will be offered online using the course management system (CMS) and will include multiple choice questions and free response questions. Examinations will be evaluated individually by the instructor, according to an established rubric and/or online grading system created in Canvas. Feedback will be provided within 1 week of the due date via Canvas/CMS grade book. Students may use accessible tools on the CMS to scheduled office hours for any query or clarification about their assignments.

Method

Class Participation

Integration

Students engagement in class discussion and provide written response to assigned questions that will be evaluated by the instructor based on an established rubric. The rubric will evaluate student's knowledge of the presented material, methodologies in testing, and equipment selection and use. The rubric will asses their understanding of how culture relates to their approach to patient care, their techniques in interacting with patients of various cultures, patient's response to medical personnel, and patient's compliance to provider's instructions.

DE Adaptations for MOE

Using the accessible tools in the course management system (CMS) students will engage in online discussion and provide written response to assigned questions that will be evaluated by the instructor based on an established rubric The rubric will evaluate student's knowledge of the presented material, methodologies in testing, and equipment selection and use. The rubric will asses their understanding of how culture relates to their approach to patient care, their techniques in interacting with patients of various cultures, patient's response to medical personnel, and patient's compliance to provider's instructions. Feedback will be provided within 1 week of the due date via the CMS grade book. Students may use accessible tools on the CMS to scheduled office hours for any query or clarification about their assignments.

Method

Class Work

Integration

Students will reflect on their understanding and synthesis of lecture material, by responding to assigned questions and/or workbook exercises. Examples of assignment may include, for instance, selecting an instrument from the textbook that is used in the laboratory and evaluate the design and use of the instrument. Students will also research the contribution of various cultures to the conception, design, implementation and use of the instrument.

Student's response to classwork assignments will be assessed by the instructor based on an established rubric.The rubric will evaluate the accuracy, relevancy, understanding and applicability of the material presented, to patient care, and timely, accurate reporting of laboratory results.

DE Adaptations for MOE

Using the accessible tools on the course management system (CMS) a list of questions will be posted online each week that corresponds to chapters of modules. Student will also use the accessible tools to respond to the questions and post their response online, by the end of the week. Individualized feedback will be provided within 1-2 weeks of the due date. ure material, by responding to assigned questions and/or workbook exercises. Student's response to classwork assignments will be assessed by the instructor based on an established rubric.The rubric will evaluate the accuracy, relevancy, understanding and applicability of the material presented, to patient care, and timely, accurate reporting of laboratory results. Students may use scheduled office hours for any query or clarification about their assignments using the accessible tools in the CMS.

Method

Class Participation

Integration

Students will participate in weekly discussions and present their response orally or in written form, to various questions, scenarios or safety issues in the lab. Students will also discuss issue of cultural competency in healthcare, highlighting discrepancies in access, treatment, health outcomes and the likelihood of certain ethnic groups developing chronic illnesses. Students will collaborate to develop disparity reducing activities in healthcare and instead, provide cultrally congruent care.

The instructor will award points for participation in the discussion sessions based on accuracy, completeness, coherence and relevance of information presented.

DE Adaptations for MOE

Using the accessible tools in the course management system (CMS) students will engage in online discussion and provide written response to assigned questions that will be evaluated by the instructor based on an established rubric which includes levels of accuracy, completeness, coherence and relevance to the topic presented or question proposed.
Students will share their findings via a discussion board where students can interact with each other. The instructor will award points for participation in the discussion sessions within 1-2 weeks of assignment completion.

Assignments

Assignment Type

Writing

In-class and/or outside of class

Outside of class

Formative or Summative

Summative

Assignment

Compare and contrast the rate of various endocrine and blood diseases among different cultural groups and determine if there is a correlation between ethnicity and disease inheritance or manifestation. Examine any physiological functions, social, economic, political, and environmental circumstances that may contribute to the incidence of diseases in the various cultural groups.
Present your findings in a research paper and present a summary of their findings to their peers. . Assignment will be graded on an established rubric which evaluates the acccuracy, cohesiveness and completeness of each assignment. . Feedback will be provided within 1-2 weeks of the due date. Scheduled office hours for any query or clarification about their assignments.

How assignment will be adapted in online format

Using the accessible tools in the course management system, compare and contrast the rate of various endocrine and blood diseases among different cultural groups and determine if there is a correlation between ethnicity and disease inheritance or manifestation. Examine any physiological functions, social, economic, political, and environmental circumstances that may contribute to the incidence of diseases in the various cultural groups. Present their findings in a research paper and present a summary of their findings to their peers. Assignment will be graded on an established rubric which evaluates the accuracy, cohesiveness and completeness of each assignment. . Feedback will be provided within 1-2 weeks of the due date via CMS grade book. Scheduled online office hours using the accessible tools in the course management system (CMS) for any query or clarification about their assignments.

Assignment Type

Writing

In-class and/or outside of class

In-class
Outside of class

Formative or Summative

Formative

Assignment

Review case studies from each chapter or module and correlate the requested tests with the corresponding diagnosis and evaluate the test results, methodology, and quality assessment protocol. Present your findings in writing and be prepared to share it with the class. Submit your write-up to the instructor. Assignment will be graded on an established rubric which evaluates the accuracy, cohesiveness and completeness of each assignment. . Feedback will be provided within 1-2 weeks of the due date.

How assignment will be adapted in online format

Using the accessible tools in the course management system work in group online to review case studies from each chapter or module and correlate the requested tests with the corresponding diagnosis and evaluate the test results, methodology, and quality assessment protocol and share their finding with other classmates using a discussion board. Present your findings in writing and

be prepared to share it with your classmates via breakout groups or chat rooms, using the course managment system. Submit your writeup online to your instructor. Assignment will be graded on an established rubric which evaluates the accuracy, cohesiveness and completeness of each assignment. . Feedback will be provided within 1-2 weeks of the due date via Canvas/CMS grade book. Scheduled online office hours using the accessible tools in the course management system (CMS) for any query or clarification about their assignments.

Assignment Type

Reading

In-class and/or outside of class

Outside of class

Formative or Summative

Formative

Assignment

Research the legislations, regulations and agencies involve in the oversight of the clinical laboratory operations. Be sure to include the Clinical Laboratory Improvement Amendment of 1988 (CLIA), Corporate Compliance Programs, Freedom of Information Act, Health Insurance Portability and Accountablilty Act (HIPAA) and the Occupational Safety and Health Administration (OSHA). Determine how these legislations and/or regulatory agencies impact health care and laboratory operations. Prepare to share your findings verbally with your classmates in small groups. Presentation of your findings will be evaluated by your peers during the group discussion. Grade will be based on peer evaluation. Peer evaluation will be based on a rubric which evaluates your presentation for accuracy, completion and and cohesiveness. Instructor feedback will be provided within 1-2 weeks of the due date.

How assignment will be adapted in online format

Using the accessible tools in the course management system (CMS), prepare a summary of your finding to share online in break out groups. Assignment will be graded on an established rubric which evaluates the accuracy, cohesiveness and completeness of each assignment. Instructor feedback will be provided within 1-2 weeks of the due date via the course management system (CMS) grade book. Scheduled online office hours using the accessible tools in the course management system (CMS) for any query or clarification about their assignments.

Assignment Type

Reading

In-class and/or outside of class

In-class

Formative or Summative

Formative

Assignment

Research journal articles on culturally conguent healthcare and share you findings with your classmates. In small groups, create at least 5 ways or means of intervention to improve culturally congruent care for patients who are not a member of your particular ethnic group. What are these measures and how would they be implemented in the workplace?

Prepare to share your findings verbally with your classmates in small groups. Presentation of your findings will be evaluated by your peers during the group discussion. Grade will be based on peer evaluation. Peer evaluation will be based on a rubric which evaluates your presentation for accuracy, completion and and cohesiveness. Instructor feedback will be provided within 1-2 weeks of the due date.

How assignment will be adapted in online format

Using the accessible tools in the course management system (CMS), prepare a summary of your finding to share online in break out groups. Assignment will be graded on an established rubric which evaluates the accuracy, cohesiveness and completeness of each assignment. Instructor feedback will be provided within 1-2 weeks of the due date via the course management system (CMS) grade book. Scheduled online office hours using the accessible tools in the course management system (CMS) for any query or clarification about their assignments.

Course Materials

Textbooks

Turgeon, M.L. (2023)Clinical Laboratory Science Concepts, Procedures and Clinical Applications.(9th Edition). St. Louis, MO: Elsevier 2023. ISBN Number 9780323829342

Class Size Information

Class Size

40

Class Size Category

A - Lecture/discussion 40

Diversity and Inclusion

Explain how diversity and inclusion(e.g., gender, culture/race, sexuality, etc.) is infused into the course.

Interactive discussions will be used to address legal, ethical, and cultural issues in phlebotomy, specimen collection and proacessing in the laboratory setting. Students will discuss how gender, culture/race and sexuality may influence patient care, and communication with patient family, staff and other medical personnel

Describe how assignments, instruction, evaluation, course content, and interactions are contextualized for diverse learners promoting an equitable course.

The use of powerpoint presentation, audio-visual recordings, demonstration of techniques, peer sharing, group presentations and student's written and oral presentations, and instructor feedback, are intended to create a variety of ways to cater to students with different learning styles.

Students will work in small groups to solve weekly case studies featuring patients from various cultural backgrounds and pathologies. Students are asked to evaluate these solutions based on their own cultural context, preferences, ideology and approach to medicine, patient care, therapeutic methodologies and cure. By overlaying medical solutions with the cultural context, students are able to discuss methodologies in medicine that would best suit individuals in their own culture, identify with the medical materials presented in the course, and evaluate their cultural practice with that of the dominant culture.

Interactions

Explain how the course will incorporate student-to-student interaction.

Students will pair-share on issues related to content, procedures, methodologies and issues in health care and phlebotomy. Students will clarify understanding of these concepts by pair-sharing interactions. Student will also engage in online discussion via the discussion tool in the course management system.

Explain how the course will incorporate instructor-to-student interaction.

The instructor provides demonstrations in conducting various laboratory tests, measurement and calculations used in the clinical laboratory. The instructor will provide feedback on student's performance and provide guided practice.

Explain how the course will incorporate student-to-content interaction.

Students will analyze content presented in class to demonstrate knowledge and understanding of laboratory procedure performed in the various departments in the clinical laboratory.

Explain how the course will incorporate student-to-self interaction (metacognitive).

Students will be assess on various laboratory skills and will reflect on their performance by writing a self-evaluation of their performance. Students will use the content presented in class to demonstrate safe and correct procedure for withdrawing blood, process specimen and perform several laboratory tests.

Key: 2998