MLT 128 - Clinical Hematology/Urinalysis/Coagulation Practicum

Approval Date:   Effective Term:

Department: MEDICAL LABORATORY TECHNICIAN  
Division: Allied Health/Public Safety  
Units: 4.00  
Grading Option: Letter Grade  
Transferability: CSU Transferable  
Course is: AA/AS Degree  
Repeatability:  
Contact Hours per Term:  
   Lab: 12.00  
Associate Degree GE Applicability: No  
Recommended Class Size: 15  
-Rationale: Station limitations.

Discipline/Minimum Qualifications:

Catalog Description:  
Provides entry-level clinical laboratory experience in the clinical laboratory hematology, urinalysis, and coagulation departments, emphasizing technique, accuracy, and precision.

Schedule Description:  
Provides entry-level clinical laboratory experience in the clinical laboratory hematology, urinalysis, and coagulation departments, emphasizing technique, accuracy, and precision.

Student Learning Outcome:  
1. Compare and contrast the methods and principles used to perform hematology, urinalysis, and coagulation testing.  
2. Perform all procedures at a level acceptable to the supervising Clinical Laboratory Scientist.

Course Objectives:  
1. Practice departmental procedures for safety according to Occupational Safety and Health Administration (OSHA) mandates.  
2. Demonstrate safe use and disposal of biohazardous materials.  
3. Explain departmental organization to include specimen processing and handling, criteria for specimen rejection, and use of the laboratory information system (LIS).  
4. Demonstrate proficiency in the operation of automated or semi-automated instrumentation.  
5. Perform and interpret all Hematology procedures performed in this department with results acceptable to the supervising Clinical Laboratory Scientist (CLS).
6. Perform and interpret all Urinalysis procedures performed in the department with results acceptable to the supervising CLS.
7. Perform and interpret all Coagulation procedures performed in the department with results acceptable to the supervising CLS.

Course Content Outline:

from supervising technologist verifying work performed, principles covered and skills competency.

F. Performing and interpreting all Hematology procedures with results acceptable to the supervising Clinical Laboratory Scientist (CLS). These include but are not limited to:
1. Peripheral blood smears:
   a. Preparing and staining smears suitable for microscopic review.
   b. Performing microscopic evaluation by reproducing normal scattergram differentials.
2. Performing the physical and quantitative analysis and microscopic preparation of body fluid smears.
3. Bone marrow aspiration and biopsy collections.
4. Performing and interpreting all Urinalysis procedures with results acceptable to the supervising Clinical Laboratory Scientist (CLS). These include but are not limited to:
   1. Performing physical and chemical analysis of urine specimens.
   2. Performing microscopic examination of urine by:
      a. Performing standardized preparation of urine sediment according to laboratory protocol.
      b. Using appropriate microscopic and staining techniques to enhance formed elements visualization.
      c. Identifying and enumerating casts and other formed elements accurately.
3. Performing confirmatory and 24 hour tests: determining analyte concentration by calculation or by reading charts/graphs.

H. Performing and interpreting all Coagulation procedures performed in this department with results acceptable to the supervising CLS. These should include, but are not limited to:
1. Performing PT, PTT and fibrinogen assays.
2. Performing technique used to perform bleeding time. Clinical significance and current interpretations of this test with supervising CLS.

A. Standard Precautions as they apply in the Clinical Urinalysis, hematology and coagulation department laboratory according to Occupational Safety and Health Administration (OSHA) mandates.
1. Basic aspects of infection control policies, including how and when to use personal protective equipment (PPE) or devices (gown, gloves, and goggles).
2. Use PPE in Urinalysis laboratory.
4. Pre and post exposure prophylactic measures for handling potentially occupational transmission of certain pathogens.
5. Disinfectants used to decontaminate the work area when a hazardous spill has occurred or when beginning or ending a laboratory session.
6. Basic steps in first aid.
7. Issues in a Safety Program:
   a. Evacuation routes,
   b. Biohazardous material,
   c. Blood borne pathogens,
   d. Standard precautions,
e. Aerosols,
f. Location of MSDS (Material Safety Data Sheets).
g. Location of fire alarms and extinguishers.
h. Location of eye wash stations and emergency showers
i. Location of spill kits
j. Location of other safety equipment.
B. Safe use and disposal of biohazardous material.
1. Segregation and disposal of various types of waste products generated in the clinical laboratory including the use of sharps containers for needles, lancets, and/or other sharps.
2. Disposal of biological samples.
C. Departmental organization including specimen processing and handling, criteria for specimen rejection and use of the laboratory information system (LIS).
1. Receive specimens submitted to the Clinical hematology, urinalysis and coagulation departments. Determination if specimens have been collected, stored and transported to the laboratory appropriately. Processing specimens according to the procedures of the clinical site.
2. Criteria and clinical site’s procedure for sample rejection if necessary.
   a. Hematology specimens
   b. Urinalysis specimens
   c. Coagulation specimens.
3. Centrifuge patient samples as required.
4. Testing workflow (what tests are performed on what analyzer).
5. Tests requiring special specimen handling.
6. Pouring off into sample cups appropriate for each test/analyzer).
7. Performing dilutions of samples when appropriate with accurate results.
8. Use of the LIS including: pending worklists, generating worklists, entering and verifying results, accessing patient result inquiry and maintaining patient confidentiality.
D. Operation of automated or semi-automated instrumentation.
1. Instrumentation used in the laboratory and the principles of operation.
   a. Advantages of using the specific instrument.
   b. Disadvantages of using the specific instrument.
2. Relating normal values to the appropriate test.
3. Checking reagent inventories and loading reagents when necessary.
4. Performing daily startup according to clinical site’s protocol.
5. Analyzing quality control products.
   a. Frequency of analyzing QC material.
   b. Identifying the correct QC material to be run per test.
   c. Explain the system function checks related to quality assurance of hematology, urinalysis and coagulation.
6. Recording and documenting the quality control results per clinical site protocol.
7. Analyzing patient samples.
8. Recognizing abnormal results and troubleshooting accordingly.
   a. Identifying the characteristics required in establishing critical values.
   b. Clinical sites protocol for reporting a critical value.
9. Evaluating and performing acceptable troubleshooting activities relative to quality control or patient results.
10. Performing daily shutdown according to clinical site’s protocol.
11. Performing routine instrument maintenance.
E. Test methods and principles
1. Documenting daily the procedures performed, including observations.
2. Obtaining signature

**Methods of Instruction:**
Lab:

**Methods of Evaluation:**
Exams/Tests/Quizzes
Skill Demonstrations

Written assignments

**Typical Assignments:**
**Reading:**

**Writing, Problem Solving or Performance:**
Perform work as assigned by the supervising CLS. Discuss methodologies, theories, and interpretation of results with supervising CLS. Analyze progress, answer questions, address concerns, and review daily laboratory worksheets during weekly meeting with MLT Coordinator. Successful operation of automated instruments Demonstration of manual dexterity and good judgment on manual procedures. Correct calculations, when applicable. Follow verbal instruction and all lab policies and protocols.

**Other:**

**Required Materials Examples:**

**Book 1**
**Author:** Carl, Jacueline H.  
**Title:** Clinical Hematology Atlas  
**Publication Date:** 2008  
**Publisher:** Saunders Co.  
**Edition:** 3rd

**Book 2**
**Author:** Turgeon, Mary Louise  
**Title:** Clinical Hematology, Theory and Procedures  
**Publication Date:** 2005  
**Publisher:** Lippincott, Williams & Wilkins  
**Edition:** 4th

**Book 3**
**Author:** McPherson, R.A. & Pincus M.R.  
**Title:** Henry's Clinical Diagnosis and Management by Lab Methods  
**Publication Date:** 2006  
**Publisher:** Saunders  
**Edition:** 21st
Course Outline

Book 4
Author: Strasinger, Susan King and Marjorie Schaub DiLorenzo
Title: Urinalysis and Body Fluids
Publication Date: 2008
Publisher: FA Davis, Co
Edition: 5th

Course Preparation:
Prerequisite(s): MLT 110
MLT 110L
MLT 112
MLT 112L
MLT 114
MLT 114L

Co-Requisite(s): None
Recommended: None

Document Content Review

Target Course Skills
Condition on Enrollment
Established

Faculty
Sue Albert Donna Berardo

Basic Content Review
In MLT 110 Clinical Hematology Lecture the students learn hematology including red blood cells, erthrocytes, anemias, cell morphology, normal and abnormal cell development, leukocytes, leukemias, lymphomas and other diseases of blood and blood forming organs. They will need this information in MLT 128 Clinical Hematology/UA/Coagulation Practicum where they will be applying this knowledge when obtaining blood specimens and performing and interpreting Hematology procedures.

Condition on Enrollment
Established

Faculty
Sue Albert Donna Berardo

Basic Content Review
In MLT 110L, Clinical Hematology Laboratory the student learns how to perform the various hematology tests such as hemoglobin and hematocrit. They learn how to measure RBCs and recognized anemias. They learn the use of equipment such as automated hematology analyzer and hemacytometer. They learn how to do blood smears and cell counts. They take this knowledge to MLT 128, Clinical Hematology/UA/Coagulation Practicum where they will utilize the knowledge to collect specimens, runt the tests and report the results.
Basic Content Review
In MLT 112, Clinical Urinalysis Lecture, students review renal anatomy and physiology, the components of a routine urinalysis, quality control and assurance used in the urinalysis department, analysis of urinalysis data and analysis of extravascular fluids. This information is applied in MLT 128, Clinical Hematology/Urinalysis/Coagulation Practicum where the students obtain specimens and review results.

Basic Content Review
In MLT 112L, Clinical Urinalysis Laboratory, students learn the types of quality control in an Urinalysis Laboratory, proper specimen collection, the protocol for the physical analysis of urine testing, the use of essential reagents or chemical reagent strips and learn the use of the microscope. They apply these skills in MLT 128, Clinical Hematology/Urinalysis/Coagulation Practicum where they obtain specimens, run tests and analyze results.

Basic Content Review
In MLT 114, Clinical Coagulation Lecture the student learns about platelet and hemostatic mechanisms. They learn about fibrinolysis and hemostasis and disorders in clotting. They learn about anticoagulation therapy and thrombosis. They learn about quality control and quality assurance as it relates to the coagulation laboratory and how to evaluate methods of measurements used in automated coagulation instrumentation. In MLT 128, Clinical Hematology/UA/Coagulation Practicum the students apply this knowledge when operating the automated and semi-automated instrumentation and performing and interpreting the Coagulation procedures performed in the department.

Basic Content Review
IN MLT 114L, Clinical Coagulation Laboratory the student learns about the various coagulation tests such as the Ivy, Duke or Simplate Bleeding Time tests, the Prothrombin test, the Activated Partial Thromboplastin Time Test. They learn about the specimen collection techniques and the various instrument options for performing the tests. They learn about the INR and they learn about quality control in a coagulation laboratory. All this knowledge is necessary when they have to get the specimens and do the tests and analyze the results in MLT 128, Clinical Hematology/UA/Coagulation Practicum which takes place in an actual lab.