MLT-1491: URINALYSIS AND BODY FLUIDS

Cuyahoga Community College

Viewing: MLT-1491 : Urinalysis and Body Fluids

Board of Trustees:
2011-09-22

Academic Term:
2012-08-28

Subject Code
MLT - Medical Laboratory Technology

Course Number:
1491

Title:
Urinalysis and Body Fluids

Catalog Description:
Theory and application of urine and body fluid analysis. Includes the anatomy and physiology of the kidney, physical, chemical and microscopic examination of the urine, cerebrospinal and other body fluids. Also includes diagnostic significance of test results and correlation with disease states, quality control, quality assurance and safety.

Credit Hour(s):
3

Lecture Hour(s):
2

Lab Hour(s):
3

Requisites
Prerequisite and Corequisite
MLT-1000 Introduction to Medical Laboratory Technology or departmental approval: related work experience.

I. ACADEMIC CREDIT

Academic Credit According to the Ohio Department of Higher Education, one (1) semester hour of college credit will be awarded for each lecture hour. Students will be expected to work on out-of-class assignments on a regular basis which, over the length of the course, would normally average two hours of out-of-class study for each hour of formal class activity. For laboratory hours, one (1) credit shall be awarded for a minimum of three laboratory hours in a standard week for which little or no out-of-class study is required since three hours will be in the lab (i.e. Laboratory 03 hours). Whereas, one (1) credit shall be awarded for a minimum of two laboratory hours in a standard week, if supplemented by out-of-class assignments which would normally average one hour of out-of-class study preparing for or following up the laboratory experience (i.e. Laboratory 02 hours). Credit is also awarded for other hours such as directed practice, practicum, cooperative work experience, and field experience. The number of hours required to receive credit is listed under Other Hours on the syllabus. The number of credit hours for lecture, lab and other hours are listed at the beginning of the syllabus. Make sure you can prioritize your time accordingly. Proper planning, prioritization and dedication will enhance your success in this course.

The standard expectation for an online course is that you will spend 3 hours per week for each credit hour.

II. ACCESSIBILITY STATEMENT

If you need any special course adaptations or accommodations because of a documented disability, please notify your instructor within a reasonable length of time, preferably the first week of the term with formal notice of that need (i.e. an official letter from the Student Accessibility Services (SAS) office). Accommodations will not be made retroactively.

For specific information pertaining to ADA accommodation, please contact your campus SAS office or visit online at http://www.tri-c.edu/accessprograms/. Blackboard accessibility information is available at http://access.blackboard.com.

Eastern (216) 987-2052 - Voice
III. ATTENDANCE TRACKING

Regular class attendance is expected. Tri-C is required by law to verify the enrollment of students who participate in federal Title IV student aid programs and/or who receive educational benefits through other funding sources. Eligibility for federal student financial aid is based in part on enrollment status.

Students who do not attend classes for the entire term are required to withdraw from the course(s). Additionally, students who withdraw from a course or stop attending class without officially withdrawing may be required to return all or a portion of their financial aid based on the date of last attendance. Students who do not attend the full session are responsible for withdrawing from the course(s).

Tri-C is responsible for identifying students who have not attended a course before financial aid funds can be applied to students’ accounts.

Therefore, attendance is recorded in the following ways:

• For in-person and blended-learning courses, students are required to attend the course by the 15th day of the semester (or equivalent for terms shorter than five weeks) to be considered attending. Students who have not met all attendance requirements for in-person and blended courses, as described herein, within the first two weeks or equivalent, will be considered not attending.

• For online courses, students are required to login at least two times per week and submit one assignment per week for the first two weeks of the semester, or equivalent to the 15th day of the term. Students who have not met all attendance requirements for online courses, as described herein, within the first two weeks or equivalent, will be considered not attending.

At the conclusion of the first two weeks of a semester or equivalent, instructors report any registered students who have “Never Attended” a course. Those students will be administratively withdrawn from that course. However, after the time period in the previous paragraphs, if a student stops attending a class or wants or needs to withdraw, for any reason, it is the student’s responsibility to take action to withdraw from the course. Students must complete and submit the appropriate Tri-C form by the established withdrawal deadline.

Tri-C is required to ensure that students receive financial aid only for courses that they attend and complete. Students reported for not attending at least one of their registered courses will have all financial aid funds held until confirmation of attendance in registered courses has been verified. Students who fail to complete at least one course may be required to repay all or a portion of their federal financial aid funds and may be ineligible to receive future federal financial aid awards. Students who withdraw from classes prior to completing more than 60 percent of their enrolled class time may be subject to the required federal refund policy.

If illness or emergency should necessitate a brief absence from class, students should confer with instructors upon their return. Students having problems with coursework due to a prolonged absence should confer with the instructor or a counselor.

IV. LEARNING OUTCOMES ASSESSMENT

Occasionally, in addition to submitting assignments to their instructors for evaluation and a grade, students will also be asked to submit completed assignments, called ‘artifacts,’ for assessment of course and program outcomes and the College’s Essential Learning Outcomes (ELOs). The artifacts will be submitted in Blackboard or a similar technology. The level of mastery of the outcome demonstrated by the artifact DOES NOT affect the student’s grade or academic record in any way. However, some instructors require that students submit their artifact before receiving their final grade. Some artifacts will be randomly selected for assessment, which will help determine improvements and support needed to further student success. If you have any questions, please feel free to speak with your instructor or contact the Learning Outcomes Assessment office.

V. CONCEALED CARRY STATEMENT

College policy prohibits the possession of weapons on college property by students, faculty and staff, unless specifically approved in advance as a job-related requirement (i.e., Tri-C campus police officers) or, in accordance with Ohio law, secured in a parked vehicle in a designated parking area only by an individual in possession of a valid conceal carry permit.

As a Tri-C student, your behavior on campus must comply with the student code of conduct which is available on page 29 within the Tri-C student handbook, available athttp://www.tri-c.edu/student-resources/documents/studenthandbook.pdfYou must also comply with the College’s Zero Tolerance for Violence on College Property available athttp://www.tri-c.edu/policies-and-procedures/documents/3354-1-20-10-zero-tolerance-for-violence-policy.pdf

Outcomes
Course Outcome(s):
A. Demonstrate safe and accountable behaviors within the laboratory setting.

Objective(s):
1. 1. Demonstrate knowledge of proper personal protective equipment (PPE) use and universal precautions.
Course Outcome(s):
D. Describe the processes of urine and body fluid sample collection and storage of specimens of test results.

Objective(s):
1. Describe the proper protocol for collection of cerebral spinal fluid (CSF) for various tests.
2. Describe the proper protocol for collection of cerebral spinal fluid (CSF) for various tests.
3. Describe the appropriate directions for random and timed collections of urine.
4. Describe the appropriate directions for random and timed collections of urine.

Course Outcome(s):
E. State the effects of inappropriate collection and storage on urinalysis and body fluid results.

Objective(s):
1. Describe the function of various additives for urine collections, and impact on test results.
2. Describe the function of various additives for urine collections, and impact on test results.
3. Describe the impact of improper collection and storage of CSF, and other body fluids where applicable.
4. Describe the impact of improper collection and storage of CSF, and other body fluids where applicable.

Course Outcome(s):
F. Describe, perform, and assess the physical, chemical, and microscopic examination of urine and correlate the results to normal and abnormal renal and non-renal conditions.

Objective(s):
1. Assess the color and clarity of samples employing the correct terminology and propose appropriate confirmatory testing.
2. Assess the color and clarity of samples employing the correct terminology and propose appropriate confirmatory testing.
3. State the reference ranges for chemical and microscopic components of the urinalysis.
4. State the reference ranges for chemical and microscopic components of the urinalysis.
5. Analyze sediment and identify the casts, crystals, organisms, artifacts, cells, and other items found in urine.
6. Analyze sediment and identify the casts, crystals, organisms, artifacts, cells, and other items found in urine.
7. Perform the dipstick/chemical methods in an orderly, efficient manner, being conservative with supplies.
8. Perform the dipstick/chemical methods in an orderly, efficient manner, being conservative with supplies.
9. State the principles of the test pads on the various common chemical urine dipsticks/confirmatory tests.
10. State the principles of the test pads on the various common chemical urine dipsticks/confirmatory tests.
11. Correlate physical and chemical results with microscopic, and recognize and resolve discrepancies.
12. Correlate physical and chemical results with microscopic, and recognize and resolve discrepancies.

Course Outcome(s):
G. Compare and contrast the principle of urinalysis methods including sensitivity, specificity, and sources of error.

Objective(s):
1. Compare and contrast the chemical tests on various brands of dipsticks.
2. Compare and contrast the chemical tests on various brands of dipsticks.
3. Discuss the principle of each confirmatory test and indicate appropriate selection of each.
4. Discuss the principle of each confirmatory test and indicate appropriate selection of each.
5. Describe the principle of the refractometer.
6. Describe the principle of the refractometer.
7. Discuss various automated analyzers.
8. Discuss various automated analyzers.

Course Outcome(s):
H. Perform and evaluate quality control/assurance procedures used in analysis of urines and body fluids.

Objective(s):
1. Analyze QC results using critical thinking skills and select appropriate course of action.
2. Analyze QC results using critical thinking skills and select appropriate course of action.
3. Recognize appropriate preparation, handling and storage of quality control (QC).
4. Recognize appropriate preparation, handling and storage of quality control (QC).

Course Outcome(s):
I. Describe the methods used in routine body fluid analyses and correlate results with normal and disease states.
Objective(s):
1. Assess the appearance of samples, employing the correct terminology and explain the cause.
2. Describe manual methods of counting and pre-treating.
3. Describe automated methods of counting and chemical analysis.

Course Outcome(s):
J. Identify formed elements in urines and body fluids and correlate to normal and abnormal states.

Objective(s):
1. Identify the major characteristics of crystals including color, solubility, polarization and relationship of pH to crystals.
2. Identify types of casts, blood cells, tissue cells, parasites/organisms, artifacts, mucous, and others.

Course Outcome(s):
B. Demonstrate knowledge of the anatomy and physiology of the urinary tract and organs.

Objective(s):
1. Perform correct disposal of specimen, chemical and biohazardous materials.
2. Identify the components of the urinary system.
3. Describe the function of each urinary system component.
4. Describe the renal threshold; identify the threshold for glucose.

Course Outcome(s):
K. Describe miscellaneous body fluid testing such as feces, sweat, osmometry, porphyrins.

Objective(s):
1. Summarize the principles of methodologies.
2. Indicate sources of error.
3. Correlate test results with clinical significance.

Course Outcome(s):
C. Demonstrate knowledge of non-urine body fluids such as synovial, cerebrospinal, serous, amniotic, and seminal fluids.

Objective(s):
1. Describe the formation of each.
2. Describe the composition of each.
3. Describe the function of each.

Methods of Evaluation:
1. Participation/Discussion
2. Quizzes
3. Training Presentation
4. Case Study Presentation
5. Homework assignments/Practice Problems
6. Laboratory exercises/Reports/Mind Stretchers
Course Content Outline:

1. Laboratory Safety
   a. Universal Precautions, statutes, PPE
   b. Location and use of safety equipment
   c. Disinfection and disposal of contaminated materials

2. Kidney
   a. Anatomy and Physiology
   b. Urine formation and composition
   c. Renal diseases

3. Urine Formation
   a. Composition
   b. Volume

4. Specimen Collection and Handling
   a. Storage
   b. Preservatives
   c. Changes in unpreserved specimens
   d. Types of specimens

5. Physical Examination of Urine
   a. Color
   b. Appearance
   c. Specific Gravity

6. Reagent strips
   a. Technique
   b. Quality Control
   c. Storage and Handling
   d. Compare methods of varying manufacturers

7. Chemical Examination of Urine, including the following for each test: principle of reactions, sources of error, normal ranges, interpretation of results and clinical significance of abnormal results, confirmatory tests for the following:
   a. Protein
   b. Glucose
   c. Ketones
   d. Blood
   e. Bilirubin
   f. Urobilinogen
   g. Nitrite
   h. Leukocytes
   i. Others: myoglobin, free fat

8. Microscopic Examination of Urine including normal ranges, interpretation of results and clinical significance of abnormal results, confirmatory tests for the following:
   a. Specimen Preparation
   b. Cells
   c. Casts
   d. Bacteria, Yeast and Parasites
   e. Spermatozoa and Mucous
   f. Crystals
   g. Artifacts

9. Quality Assurance
   a. Quality control
   b. Confirmatory testing
   c. Correlation of chemical and microscopic

10. Abnormal Metabolic Substances
    a. Overflow
    b. Renal

11. Errors of Phenylalanine-Tyrosine Pathway
    a. Phenylketonuria
    b. Tyrosinuria
c. Alkaptonuria
d. Melanuria

12. Additional Amino Acid Disorders
   a. Maple Syrup Disease
   b. Hartnup Disease
   c. Indicanuria
   d. Cystinuria

13. Porphyrin Disorders

14. Fecal Analysis

15. Other Types of Body Fluid and their Collection
   a. Amniotic Fluid
      i. Appearance
         1. Normal
         2. Abnormal
      ii. Function
      iii. Tests performed and their clinical diagnostic significance
         1. Chromosomal Analysis
         2. Screening of Neural Tube Defects
         3. Bilirubin
         4. LS Ratio
         5. Foam Stability Index
   b. Cerebrospinal Fluid
      i. Appearance
         1. Normal
         2. Abnormal
      ii. Function
      iii. Tests performed and their clinical diagnostic significance
         1. Chemistry
            a. Glucose
            b. Total Protein
            c. Specific Proteins
         2. Microscopic Analysis: Hematology WBC/RBC, Microbiology
   c. Synovial Fluid
      i. Appearance
      ii. Function
      iii. Tests performed and their clinical diagnostic significance
         1. Glucose
         2. Microscopic Analysis
   d. Pleural Fluid
      i. Appearance
      ii. Function
      iii. Tests Performed and their clinical diagnostic significance
         1. Microbiology
         2. Microscopic Analysis
         3. Chemistry
            a. Total Protein
            b. LDH
            c. Glucose
            d. Amylase
            e. Triglyceride
            f. pH
   e. Peritoneal Fluid
      i. Appearance
      ii. Function
      iii. Tests performed and their clinical significance
   f. Semen Analysis
      i. Appearance
      ii. Tests performed and their clinical significance

16. Equipment Usage Overview and Troubleshooting
a. Microscope  
b. Centrifuge  
c. Refractometer  

17. Automation

Resources


Instructional Services

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