

BARTON COMMUNITY COLLEGE COURSE SYLLABUS

I. GENERAL COURSE INFORMATION

Course Number: MLTC 1504

Course Title: MLT Clinical Chemistry

Credit Hours: 6

Prerequisite: Fundamentals of General Chemistry and General Microbiology and Anatomy & Physiology or equivalents, passed with a minimum of a C or instructor permission.

Division/Discipline: Workforce Training and Community Education Division, Medical Laboratory Technology Program.

Course Description: This course will cover the physiology of the body and the biochemical reactions that are necessary for a healthy existence. The human condition is evaluated by biochemical shifts in different systems that maintain homeostasis during healthful periods. Basic interpretations of biochemistry and the concentration of enzymes, carbohydrates, lipids, proteins, electrolytes, blood gases, and therapeutic drug monitoring will be discussed. The student will perform routine clinical tests on biological fluids, maintain quality assurance records, and perform preventative maintenance on instrumentation. Hands on laboratory time is required.

II. INSTRUCTOR INFORMATION

III. COLLEGE POLICIES

Students and faculty of Barton Community College constitute a special community engaged in the process of education. The College assumes that its students and faculty will demonstrate a code of personal honor that is based upon courtesy, integrity, common sense, and respect for others both within and outside the classroom.

Plagiarism on any academic endeavors at Barton Community College will not be tolerated. The student is responsible for learning the rules of, and avoiding instances of, intentional or unintentional plagiarism. Information about academic integrity is located in the Student Handbook.

The College reserves the right to suspend a student for conduct that is determined to be detrimental to the College educational endeavors as outlined in the College Catalog, Student Handbook, and College Policy & Procedure Manual. (Most up-to-date documents are available on the College webpage.)

Any student seeking an accommodation under the provisions of the Americans with Disability Act (ADA) is to notify Student Support Services via email at disabilityservices@bartonccc.edu

IV. COURSE AS VIEWED IN THE TOTAL CURRICULUM

This course is one of a series of technical courses for the Medical Laboratory Technology Program. It is designed to aid the student in the development of knowledge, competencies and critical thinking related to chemistry analytes, instrumentation, quality control, safety and human physiology relating to disease states. Students will develop job-oriented skills and safety practices for medical laboratory testing. This course includes information, at a minimum, from the current Body of Knowledge for Medical Laboratory Technicians.

Students planning to transfer credit for a baccalaureate degree will be granted transfer credit only as determined by the four year institution.

The transferability of all college courses will vary among institutions, and perhaps even among departments, colleges, or programs within an institution. Institutional requirements may also change without prior notification. Students are responsible to obtain relevant information from intended transfer institutions to ensure that the courses the student enrolls in are the most appropriate set of courses for the transfer program.

V. ASSESSMENT OF STUDENT LEARNING

Barton Community College is committed to the assessment of student learning and to quality education. Assessment activities provide a means to develop an understanding of how students learn, what they know, and what they can do with their knowledge. Results from these various activities guide Barton, as a learning college, in finding ways to improve student learning.

Course Outcomes, Competencies, and Supplemental Competencies

Upon completion of this course the student will be able to do the following:

- A. Relate the proper specimen collection and handling, type of quality control used, reference ranges, principle of analysis currently available, and sources of analytical errors for each of the analytes discussed or approached in the course to include:
 1. Carbohydrates
 2. Lipids
 3. Proteins
 4. Enzymes
 5. Non-protein nitrogens
 6. Electrolytes and trace elements.
 7. Acid-base and blood gas studies.
 8. Therapeutic drug monitoring and toxicology.
 9. Synthesis and metabolism of hemoglobin.
 10. Body fluids.
 11. Endocrinology
 12. Genetic disorders

- B. Perform all procedures with regard to prescribed safety protocol and confidentiality.

- C. Correlate abnormal results with the most likely disease process by determining the clinical significance of the findings.
- D. Outline the normal digestion, anabolism and catabolism of carbohydrates, proteins, and lipids within the body.
- E. Discuss the basic principles of laboratory instrumentation and state how they relate to the measurement of serum or body fluid analytes.
 - 1. Spectrophotometer/photometer.
 - 2. Electronics and troubleshooting techniques.
 - 3. Fluorometer.
 - 4. Osmometer.
 - 5. pH meter.
 - 6. Blood gas analyzers.
 - 7. Refractometer.
 - 8. Balances.
 - 9. Centrifuges.
 - 10. Heating Units.
 - 11. Electrophoresis
 - 12. Chromatography
 - 13. Automated analyzers.
 - 14. Densitometry/nephelometry.
 - 15. Coulometry.
 - 16. Molecular.
- F. Demonstrate an understanding of the mechanism by which the body regulates water and pH homeostasis.
- G. Discuss the anatomy and physiology of the following organs or systems. State some of the common pathological states and what analyte measurements would be utilized to monitor the function of each: Renal, Cardiovascular, Hepatic, Thyroid, Bone, and Pancreatic.
- H. List the reasons that therapeutic drugs are monitored and state the current drugs most often monitored and the procedure most often used.
- I. Demonstrate the following skills as pertaining to each individual test that is listed.
 - 1. Relate the proper specimen collection and handling techniques.
 - 2. Perform acceptable quality control measures.
 - 3. Determine if results are within the acceptable reference range.
 - 4. State the principle of analysis of the method available.
 - 5. State sources of error and methods to minimize or eliminate these errors.
 - 6. Perform the analysis within +/- 2SD of the recognized mean for a control serum; proteins, enzymes, electrolytes, carbohydrates, lipids, non-protein nitrogens.
 - 7. Perform & Calculate: creatinine clearance, anion gap, osmolarity, dilutions, VLDL, LDL, and Beers Law.

- J. Explain the basic principles of laboratory instrumentation available in the clinical labs to include the following:
1. Spectrophotometer/photometer.
 2. Electronics and troubleshooting techniques.
 3. Fluorometer.
 4. Osmometer.
 5. pH meter.
 6. Blood gas analyzers.
 7. Refractometer.
 8. Balances.
 9. Centrifuges.
 10. Heating Units.
 11. Electrophoresis
 12. Chromatography
 13. Automated analyzers.
 14. Densitometry/nephelometry.
 15. Coulometry.
 16. Molecular.
- K. Perform routine preventative maintenance and troubleshooting procedures on the instruments available.
- L. Determine if the results on different analytes are consistent as far as determining the status of the following organs or systems: Renal, cardiovascular, hepatic, pancreatic, thyroid and bone.
- M. Define, identify and describe common clinical chemistry terminology as it relates to the point of care and clinical laboratory environment; to include but not limited to the following
1. Quality control.
 2. Quality Assurance.

VI. INSTRUCTOR'S EXPECTATIONS OF STUDENTS IN CLASS

VII. TEXTBOOKS AND OTHER REQUIRED MATERIALS

VIII. REFERENCES

IX. METHODS OF INSTRUCTION AND EVALUATION

X. ATTENDANCE REQUIREMENTS

XI. COURSE OUTLINE