



**The University of Texas at El Paso
College of Health Sciences
Clinical Laboratory Science Program**

CLSC 3164 – Clinical Chemistry II Laboratory

**Syllabus
2020 Spring Semester**

I. Course Information:

Laboratory Schedule: Tuesday 1:30pm-4:30pm

Room: CHS 137

Lecturer: Nancy Cruz, MS, MLS (ASCP)^{CM}

Email: ndcruzsanch@utep.edu

Office: College of Health Sciences (CHS) Room 419

Office Hours: Tuesday 9:30am – 11:30am

If you are unable to meet me at this time you may schedule an appointment at another time using Blackboard, in person (after laboratory session) or by email.

II. Course Description:

The Clinical Chemistry II Laboratory course is designed to develop and refine skills in performing clinical chemistry testing by applying the theory learned in lecture. Clinical Chemistry is a rapidly changing area in laboratory medicine because of the variety of automated instrumentation available. It is essential, therefore, that the basic principles as well as the techniques used in clinical chemistry be mastered by the laboratorian. These include the basic theory of chemical determinations, use and care of laboratory equipment and apparatus, application of quantitative measurement, proper preparation of reagents, recognition of problems when they arise, proper collection and handling of specimens, reporting of results, quality control, troubleshooting, and the use of quality assurance protocol in the performance of any procedure in the laboratory. This laboratory provides the basic skills necessary for performing clinical chemistry laboratory analysis. Several fundamental laboratory methods will be performed by the students using common clinical chemistry principles. These laboratory assays provide the basis for most clinical chemistry analyses which will be demonstrated in the clinical hospital laboratory rotations. The course includes the principles and practices of quality control, troubleshooting, and pre-analytical, analytical and post-analytical phases of testing in the clinical chemistry laboratory. The uses and general principles of selected tests and methodologies in the clinical chemistry laboratory will be discussed, as the student performs the test. There will be additional focus on laboratory mathematics and how it is applied to obtain the results achieved. In addition, the laboratory pays close attention on the pathophysiology of each analyte

after detection or quantification as it pertains to clinical chemistry by interpreting their results.

Course co-requisite: CLSC 3365 (Clinical Chemistry II Lecture)

Course pre-requisite: CLSC 3354 and 3155: Each with a grade of "C" or better and department approval.

III. Course Goal:

This course is designed to provide the student with basic clinical chemistry foundations to promote and facilitate the understanding of this complex science. The student will learn to competently perform basic procedures and correctly interpret the findings given adequate clinical data. This course will provide the student with the knowledge to accurately distinguish between normal and abnormal results and identify various testing procedures to evaluate the patient's results considering clinical evidence. The student will also learn how to competently perform quality control procedures and troubleshooting when quality control problems arise.

IV. Course Objectives:

A. Cognitive:

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

1. Describe basic principles and practices in clinical chemistry including:
 - a. Common types of pipettes
 - b. Proper centrifuge loading
 - c. Selection of appropriate glassware
 - d. Selection of appropriate micropipettes and glass pipettes
 - e. Selection of appropriate micropipette tips
 - f. Disposal of laboratory waste
 - g. Proper use of spectrophotometer and microtiter plate reader.
2. Analyze laboratory safety regulations.
3. Understand and implement the usage of protective equipment in the laboratory.
4. Discuss, understand and implement universal precautions policy.
5. Understand and implement the appropriate procedures for the handling, disposal, decontamination, and spill control of biohazards and chemicals handled in the laboratory.
6. Understand and implement proper labeling for chemicals and materials used in the laboratory.
7. Differentiate quality assurance from quality control.
8. Distinguish the difference between calibrators (standards) and controls.
9. Understand the different analytical techniques and instrumentation used in the clinical laboratory.
10. Analyze the importance of laboratory mathematics in the clinical laboratory.
 - a. Use Beer's Law to calculate an analyte's concentration.

- b. Construct a standard curve by plotting absorbances obtained from standard analyte analysis on linear graph paper and determine the unknown sample's concentration based on the graph.
11. Recognize the normal ranges or reference intervals for major analytes (and analytes seen in lab).
 - a. List their normal ranges or reference intervals.
 - b. Utilize the normal ranges or reference values to evaluate abnormal results.
 - i. Evaluate the possibility of reporting the patient's results.
 - ii. Recognize any discrepancy in results.
 - iii. Interpret results in a timely manner.
 12. Assess the pre-analytical, analytical and post-analytical factors that affect a patient's results:
 - a. Determine sample integrity and factors that affect it.
 - b. Apply specimen rejection criteria.
 - c. Recognize sources of error in methods used.
 - i. Recognize interfering substances for different analytes and how they affect the patient's results.
 - d. Prioritize and differentiate between STAT and routine samples.
 - e. Evaluate the role of the CLS in monitoring the 3 phases of testing.
 - f. Propose strategic plans to diminish the factors that affect patient results.
 13. Demonstrate and apply knowledge of quality control.
 - a. Select the appropriate controls for the test to be performed.
 - b. Interpret the control results to identify a problem.
 - i. Use Westgard Rules to analyze control results.
 - c. Formulate plan for corrections.
 - d. Analyze and record all data obtained.
 - e. Calculate SD, 2SD, 3SD (limits) and build a Levey-Jennings chart based on data obtained.
 14. Understand the importance of Periodic Maintenance in the laboratory.
 15. Select reagents, correctly calibrate and operate equipment, perform and describe procedures, interpret results (pathophysiology), and evaluate the significance of tests and results performed in the clinical chemistry lab.

B. Affective:

To show the appropriate responsible behaviors students will demonstrate:

1. A positive attitude by being prepared for laboratory sessions, completing assigned tasks on time and displaying self-motivation.

2. Organization by utilizing time effectively, sequencing and prioritizing tasks for completion with the time constraints and maintaining a neat, clean work area.
3. Adherence to safety rules by: avoiding eating, drinking, and chewing gum in the laboratory.
4. Attention to detail by diligently pursuing accuracy and documenting data accurately and legibly.
5. Problem solving ability by explaining purpose of each step-in diagnosis, interpretation, procedure, recognizing discrepancies in techniques or procedures and repeating necessary lab test when necessary.
6. Follow directions and work independently after being given directions.
7. Stability and self-confidence by approaching and performing routine tasks confidently without assistance and maintaining composure.
8. Appropriate interpersonal skills by cooperating and communicating effectively with classmates and instructor. Displaying courteous, considerate behavior and appropriate appearance.
9. Ethical behavior and integrity by respecting confidentiality of patient information, complying with professional standards and code of ethics, adhering to safety policies and abiding by all rules and regulations of the institution.

C. Psychomotor:

After learning experiences are introduced, the student will gradually and completely:

1. Perform quality control procedures on reagents, instruments, refrigerators, incubators and other laboratory equipment and/or instrumentation used.
2. Observe universal precautions when handling blood and body fluid specimens.
3. Dispose of biohazardous materials (contaminated gloves, paper towels, plastic pipettes, etc.) in the appropriate containers.
4. Dispose of clean sharps (i.e. clean but broken laboratory glassware) in the **glass only** container.
5. Dispose of contaminated sharps (i.e. bloody glassware, needles) in the **red sharps** container.
6. Dispose of clean paper towels, papers, etc., in the regular trash can.
7. Clean and organize the work area after each laboratory session.
8. Perform all protocols introduced in this course per experiment appropriately, following the instructions of the procedure to determine analyte concentration.
9. Perform enzymatic, colorimetric, and immune assays using proper materials and equipment necessary.
10. Proper use of a spectrophotometer, water bath, heating block, centrifuge, and other equipment necessary for the procedure being performed.

V. Course Policies:

A. Textbook: **Clinical Chemistry: Techniques, Principles, Correlations Correlation, 8th edition. Bishop, M.L.**

B. Attendance and Participation Policies:

1. The student will be expected to attend **ALL** laboratory sessions in a **timely fashion**.
2. The student is expected to actively participate in each laboratory session.
3. Absences: After 2 absences you will be given a written warning. If absent 3 times, you may be dropped from the course.
4. Tardiness: Students arriving after 10 min will be considered tardy (points will be deducted).
5. It is responsibility of the student to notify the instructor of any absence and to provide **legitimate** documentation of absence as per University regulations.
6. The instructor reserves the right to drop a student due to tardiness or absenteeism, when, in the judgment of the instructor, a student has been absent to a degree as to impair his or her status relative to credit for the course. The instructor may drop the student from the class with a **“W”** before the course drop deadline or an **“F”** after the course drop deadline (November 1st, 2019).
7. In case of being absent to a laboratory session, **NO MAKE UP LABS WILL BE AVAILABLE. NO EXCEPTIONS.**

C. Laboratory Policies:

1. The student will present to the laboratory session wearing the appropriate clothing: i.e.:
 - a. Scrubs
 - b. If the student is not wearing scrubs:
 - i. Long jeans/pants/skirts (**NO** leggings)
 - ii. Appropriate shirt with sleeves (**NO** cleavage, tank tops, halter tops, see through, crop tops)
 - c. Closed shoes (sneakers, boots, crocs (no holes)) (**NO** sandals or open toed shoes allowed).
 - i. **Shoes must be made of non-porous materials and meet OSHA requirements. CANVAS OR WEBBED MATERIALS ARE NOT ACCEPTABLE**
 - d. Hair must be tied back (i.e. pony tail, bun, braid)
 - e. **NO** charm bracelets, long earrings, long necklaces permitted.
2. Personal protective equipment (PPE):
 - a. The student will wear the appropriate personal protective equipment at **ALL TIMES** in the laboratory (gloves, lab coat, face shield, etc.)

- b. **NO** student will be allowed in the laboratory without the appropriate PPE.
- 3. **NO eating, drinking, chewing gum or smoking in the laboratory.**
- 4. Personal belongings have a designated area. **NO** personal belongings will be permitted in the laboratory with the exception of pencils, pens, sharpies, handouts, books, and calculators.
- 5. Cell phone usage is **NOT** permitted in the laboratory.
 - a. Exceptions can be made in case of emergency. **Speak with the instructor beforehand.**
 - b. Phone **MUST** remain in silent mode with personal belongings in designated area.

D. Instructional Policies:

- 1. Students are required to read, ahead of time, handouts and other resources provided in Blackboard for the laboratory exercise.
- 2. Students are required to come to the laboratory session with the material for the laboratory exercise.
- 3. Students are required to hand in assignments in a timely manner.
 - a. Deadlines will be announced previously as assignments are programmed and requested on each laboratory session.
 - i. Deadlines will be posted on Blackboard in the announcement section and written in the assignment/laboratory report or laboratory protocol document.
 - b. Failure to hand in/complete an assignment in a timely manner will lead to a 2-point deduction each day the assignment is late (includes weekends and holidays).
 - i. If a legitimate reason/excuse (death, illness, etc.) prevents the student from handing the assignment on the due date, inform the instructor as soon as possible, bring the necessary documentation and considerations may be made, depending on situations, on an individual basis.
 - ii. **NO** make up assignments will be offered.

E. Quiz and Exam Policy:

If a student cannot attend a test, quiz or final exam for a university-acceptable excuse, inform the instructor as soon as possible and a time will be arranged accordingly with the instructor's schedule.

F. Academic Integrity:

There is a **zero tolerance level** for academic dishonesty. Honesty and integrity are a critical aspect of your chosen profession, as well as patient confidentiality. Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes, but it's not limited to:

1. Cheating
2. Plagiarism - means the appropriation of another person's ideas, processes, results, or words without giving appropriate credit. This includes intentionally, knowingly or carelessly, presenting the work of another as one's own; failing to credit sources used in a work product; attempting to receive credit for work performed by another; failing to cite the World Wide Web, databases and other electronic resources. Written work will be checked for plagiarism.
3. Collusion
4. The submission for credit of any work or material that is attributable (whole or in part) to another person (i.e. copying from another student).
5. Taking an examination for another person
 - a. Any act designed to give unfair advantage to a student or the attempt to commit such acts.

Proven violations of the detailed regulations, as printed in the *Handbook of Operating Procedures (HOP)* (available in the Office of the Dean of Students), may result in sanctions ranging from disciplinary probation, failing grades on the work in question, failing grade in the course, suspension or dismissal, among others.

G. Classroom Accommodations:

If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148, by email to cass@utep.edu, or visit their office located in UTEP Union East, Room 106. For additional information, please visit the CASS website at www.sa.utep.edu/cass.

Please feel free to contact me if you need any assistance, guidance or help in the matter or with anything else you need.

VI. Grading Policy:

Evaluation Technique	%
Attendance, Participation, Lab Skills	10%
Assignments	20%
Quizzes (Schedules and Unscheduled)	15%
Written Mid Term Exam	25%
Final Exam	30%
Total	100%

Grading Scale	Grade
90-100	A
80-89	B
75-79	C
70-74.9*	D*
69 or below*	F*
* A grade of 75 or above is required to continue in the CLS program	
100%	

VII. Supplementary information:

Additional information regarding Fall Semester important dates, other campus news, activities and resources are posted on the University website (www.utep.edu).