



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



CLSC 3164: Clinical Chemistry II Laboratory
Syllabus
Spring 2022

I. Course Information

Laboratory Schedule: Mondays 1:00pm-4:00pm

- Time in lab will vary.
- You **must complete all your laboratory testing before you can leave the lab**, therefore, plan on staying until your assignments/laboratory procedures/testing have been completed.
 - Please let all the significant people in your lives know that there is a high probability that occasionally you will be coming home late.

Room: CHS 137

II. Instructor Information

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

Email: ndcruzsanch@utep.edu

Office: College of Health Sciences (CHS) Room 426

Office Phone Number: 915-747-7243

Office Hours: Available Tuesday - Friday: 9:00am – 11:30am: **by Appointment**

- **If you cannot schedule an appointment during these times, please contact me after class/lab or via email.**
- **Multiple students may be scheduled for the same office hour session. If it is a private matter or you wish to discuss material or have questions and prefer to have a private office hour session, please make sure to notify the instructor when appointment is being made.**
- **Students **must** use their UTEP email when communicating, scheduling appointments, questions, etc.**

III. 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.

IV. 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.

V. 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.
 - Evaluate the possibility of reporting the patient's results.
 - Recognize any discrepancy in results.
 - 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.
 - 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.

- 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. Educational initiative and a positive attitude by being prepared for laboratory sessions, completing assigned tasks on time, and displaying self-motivation.
2. Adaptability and flexibility to change and learning.
3. Good judgement and exercise emotional intelligence by accepting personal responsibility for consequences of one's own actions.
4. Organization by utilizing time effectively, sequencing, and prioritizing tasks for completion with the time constraints and maintaining a neat, clean work area and instrumentation.
5. Adherence to safety rules by avoiding eating, drinking, and chewing gum in the laboratory.
6. Attention to detail by diligently pursuing accuracy and documenting data accurately and legibly, utilizing strict overall technique, competent quality control techniques, sound critical thinking skills and strong professional ethics.
7. 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.
8. Dependability by following directions and working independently after being given directions.
9. Maturity, stability, and self-confidence by approaching and performing routine and stressful tasks confidently without assistance and maintaining composure, and by defining and being aware of personal limitations, seeking help when needed and pursuing continuing education independently.
10. Appropriate interpersonal skills by cooperating and communicating effectively with classmates and instructor(s) (faculty). Displaying courteous, considerate behavior and appropriate appearance.

11. Application of ethical behavior, integrity, and professionalism 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 CLS Program and the institution.
12. Commitment to organizational and professional policies regarding appearance, safety, confidentiality, and ethics by following UTEP's CLS Program Standards.

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.

VI. Course Policies

A. Textbook: Bishop, Michael L., Fody, Edward P., Schoeff, Larry E. 2018. *Clinical Chemistry. Principles, Techniques and Correlations. 8th Edition.* Wolters Kluwer.

B. Instructional Policies

1. Material and resources for the class will provided using the following:
 - a. Blackboard
 - b. You Tube
2. The student must have available or have access to the following technological resources:

- a. Computer/laptop with camera (webcam), audio and microphone.
- b. USB flash drive
- c. Good internet connection
- d. Microsoft Office (Word, Power Point, Excel)
- e. Adobe (PDF) Flashplayer
- f. Windows Media Player
- g. Internet browser (i.e., Google Chrome, Mozilla Firefox)
- h. Blackboard's Respondus LockDown Browser

3. LockDown Browser + Webcam Requirement

- a. This course requires the use of LockDown Browser and a webcam for online quizzes and exams. The webcam can be the type that is built into your computer or one that plugs in with a USB cable. Watch this brief video to get a basic understanding of LockDown Browser and the webcam feature.

- <https://www.respondus.com/products/lockdown-browser/student-movie.shtml>

b. Download Instructions

- Download and install LockDown Browser from this link:<https://download.respondus.com/lockdown/download.php?id=586140509>
 - Once Installed:
 - ◊ Start LockDown Browser
 - ◊ Log into Blackboard Learn
 - ◊ Navigate to the test
 - ◊ Note: You will not be able to access tests with a standard web browser. If this is tried, an error message will indicate that the test requires the use of LockDown Browser. Simply start LockDown Browser and navigate back to the exam to continue.

c. Guidelines

- When taking an online test, follow these guidelines:
 - ◊ Ensure you are in a location where you will not be interrupted
 - ◊ Turn off all other devices (e.g., tablets, phones, second computers) and place them outside of your reach
 - ◊ Before starting the test, know how much time is available for it, and that you have allotted sufficient time to complete it
 - ◊ Clear your desk or workspace of all external materials not permitted - books, papers, other devices

- ◊ Remain at your computer for the duration of the test
 - ◊ If the computer, Wi-Fi, or location is different than what was used previously with the "Webcam Check" and "System & Network Check" in LockDown Browser, run the checks again prior to the exam
 - ◊ To produce a good webcam video, do the following:
 - i. Avoid wearing baseball caps or hats with brims
 - ii. Ensure your computer or device is on a firm surface (a desk or table). Do NOT have the computer on your lap, a bed, or other surface where the device (or you) is likely to move
 - iii. If using a built-in webcam, avoid readjusting the tilt of the screen after the webcam setup is complete
 - iv. Take the exam in a well-lit room but avoid backlighting (such as sitting with your back to a window).

- d. Remember that LockDown Browser will prevent you from accessing other websites or applications; you will be unable to exit the test until all questions are completed and submitted.

- e. Getting Help
 - Several resources are available if you encounter problems with LockDown Browser:
 - The Windows and Mac versions of LockDown Browser have a "Help Center" button located on the toolbar. Use the "System & Network Check" to troubleshoot issues. If an exam requires you to use a webcam, also run the "Webcam Check" from this area
 - As applicable, insert information about your institution's help desk, including details about how to contact them. Some help desks want students to run the "System & Network Check" and the "Webcam Check" before they are contacted - and even, to forward the results of these checks at the time of opening a ticket.
 - Respondus has a Knowledge Base available from support.respondus.com. Select the "Knowledge Base" link and then select "Respondus LockDown Browser" as the product. If your problem is with a webcam, select "Respondus Monitor" as your product.
 - If you are still unable to resolve a technical issue with LockDown Browser, go to support.respondus.com and

select "Submit a Ticket". Provide detailed information about your problem and what steps you took to resolve it.

4. Students are required to read, ahead of time, handouts, laboratory exercise protocol, and other materials and/or resources provided in Blackboard.
5. Students are required to come to the laboratory session with the **printed** material for the laboratory exercise (i.e., laboratory protocol, data/calculations/observations sheet).

C. Quiz and Exam Policy

1. Quizzes and Exams will be taken in the laboratory (classroom if available) in written or electronic form (Blackboard).
2. Quizzes may be announced or unannounced.
3. No make-up exams or quizzes will be given.
4. If an exam or quiz is missed the grade will be 0. All grades will be used for calculating the final grade, no grades will be dropped.
5. If a student cannot attend a test, quiz, midterm, 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. 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 will assign each student a seat for the examination.
7. All personal belongings including laboratory material, documents, etc. must be kept in the designated area for personal belongings or in the bench drawers (lab material).
8. If a calculator is needed for the exam, the instructor will let you know ahead of time. Calculator lids must be kept with your personal belongings. The instructor will check the calculators (especially if a scientific or graphic calculator is being used).

D. Assignment / Lab Report Policy

1. Students are required to hand in assignments (laboratory reports) in a timely manner.
 - a. Deadlines will be announced previously as assignments are programmed and requested on each laboratory session.
 - 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)**.
 - 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.

- **NO** make-up assignments will be offered.
- **It is suggested that the student submit the assignment before the due date.**

- c. Assignments/laboratory reports are to be submitted **neatly** as a pdf file, via Blackboard, in the available corresponding folder. They should be submitted with **ALL** calculations performed and corresponding data and units. Failure to do so will result in point deduction according to the exercise values.
- d. Assignments/laboratory reports are to be properly identified (name, date) and **must** include the lab partner collaboration sheet.
- e. Laboratory reports must contain **ALL** laboratory data, calculations, significant figures, results, and units properly identified and presented. If graphs are required, they must contain proper axis identification, title, units, data, and data identification (legend).

E. Attendance and Participation Policies

1. The student is expected to attend **ALL** laboratory sessions in a **timely fashion**.
2. The student is expected to actively participate in each laboratory session.
3. The student is expected to access Blackboard regularly for material availability, announcements, etc.
4. The student should spend 2-3 hours a week studying the material and resources provided by the instructor and textbook.
5. Absences: After 2 absences you will be given a written warning. If absent 3 times, you may be dropped from the course.
6. Tardiness: Students arriving after 10 minutes will be considered tardy (points will be deducted).
7. It is responsibility of the student to notify the instructor of any absence and to provide legitimate documentation of absence as per university regulations.
8. 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.
 - a. April 1st, 2022
9. In case of being absent to a laboratory session, **NO MAKE-UP LABS WILL BE AVAILABLE. NO EXCEPTIONS.** The student is responsible for the material discussed in class as well as announcements made in class.
10. The student is expected to participate in office hours.
 - a. Multiple students may be scheduled for the same office hour session.

- b. If it is a private matter or you wish to discuss material or have questions and prefer to have a private office hour or online session, please make sure to notify the instructor when appointment is being made.

F. Laboratory Policies

1. The student will present to the laboratory session wearing the appropriate clothing, i.e.,
 - a. Scrubs
 - CLS Junior Year Scrubs
 - CLS Senior Year Scrubs
 - b. If the student will not be wearing scrubs, the student must dress **appropriately** for a laboratory:
 - Long jeans/pants/skirts (**NO** leggings)
 - 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).
 - **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., ponytail, bun, braid).
 - e. **NO** charm bracelets, long earrings, long necklaces permitted.
2. Personal protective equipment (PPE)
 - a. The student must 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.

6. Masks are not mandated for students, faculty or staff in the laboratory or at UTEP (per UTEP policies). However, if the student prefers to wear a mask, he/she can.
 - a. **This policy is subject to change depending on public health circumstances and UTEP policy change regarding this matter.**

7. COVID-19 PRECAUTION STATEMENT
 - a. Please stay home if you have been diagnosed with COVID-19 or are experiencing COVID-19 symptoms. If you are feeling unwell, please let me know as soon as possible, so that we can work on appropriate accommodations. If you have tested positive for COVID-19, you are encouraged to report your results to covidaction@utep.edu, so that the Dean of Students Office can provide you with support and help with communication with your professors. The Student Health Center is equipped to provide COVID-19 testing.
 - b. The Center for Disease Control and Prevention recommends that people in areas of substantial or high COVID-19 transmission wear face masks when indoors in groups of people. The best way that Miners can take care of Miners is to get the vaccine. If you still need the vaccine, it is widely available in the El Paso area, and will be available at no charge on campus during the first week of classes. For more information about the current rates, testing, and vaccinations, please visit epstrong.org.

G. Etiquette guidelines

1. Treat instructor and classmates with respect.
2. Address instructor and classmates properly and accordingly.
3. Use clear and appropriate language.
4. Vulgar/obscene language, discrimination because of race, color, ethnicity, gender, political or religious views, and inappropriate conduct is **prohibited** in class/lab.
5. The instructor reserves the right to ban the student from the laboratory if vulgar language is being used, if student is being disrespectful toward the instructor or classmates or exhibiting inappropriate conduct. This will be considered an absence, and no-make-up laboratories will be administered. The student will be reported to the CLS program director.

H. 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

This means:

- a. Copying from the homework, in-class work or exam paper of another student.
- b. Engaging in written, oral, or any other means of communication with another student during an exam or homework assignment or giving aid to or seeking aid from another student during a test.
- c. Possession and/or use of test material (class notes, books, reviews, outlines, or any other material) not authorized by the instructor or exam proctor during an exam or quiz.
- d. Using, obtaining, or attempting to obtain, by any means, a part of the whole test, test key, homework solution, computer program, and tests administered during past semesters.
- e. Substituting for another person or another person substituting one's self to take a test/quiz.
- f. Falsifying data, laboratory reports and/or other records or academic work offered for credit.

2. Plagiarism

This means:

- a. The appropriation, buying, receiving as a gift, or obtaining by any means another's work, 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.
- b. 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).

3. Collusion

This means the unauthorized (secret or illegal) collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any provision of the rules on scholastic dishonesty.

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.

I. Student Support

In case of needed assistance:

1. Helpdesk
 - a. <https://www.utep.edu/irp/technologysupport/>
2. Miner Learning Center
 - a. <https://www.utep.edu/mlc/>
3. University Library
 - a. <https://www.utep.edu/library/>
4. Counseling and Psychological Services
 - a. <https://www.utep.edu/student-affairs/counsel/>
5. Student Support Services Program
 - a. <https://www.utep.edu/student-affairs/student-support-services-program/>

J. 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.

K. University Counseling Center

If you have personal issues and feel like you need assistance, the university offers counseling services and resources. They are available online and in person through the Division of Student Affairs. You can access these services:

1. Online: <https://www.utep.edu/student-affairs/counsel/index.html>
2. By phone: 915-747-5302
3. Email: caps@utep.edu
4. In Person: Counseling Center
202 Union West
El Paso, Texas 79968

VII. Grading Policy

Evaluation Technique	%
Assignments	25%
Quizzes (Scheduled or Unscheduled) (Announced or Unannounced)	20%
Written Mid Term Exam	25%
Written 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.	