The University of Texas at Tyler

CHEM 1320 Forensic Chemistry I

Spring 2024

Tuesdays
1:30-4:30 pm

Instructor Information:

	Office	Office Hours	Email	Phone
Dr. Laura Boyd Miller	RBS 3032	M, F 9:00-10:00 am; T 10 -11 am; W 1:30-3:30 pm	lboyd@uttyler.edu	566-7137

Table of Contents

Instructor Contact	1
Course Description	1
Course Require-	1
Student Learning Outcomes	2
Instructional Materi-	2
Tentative Topics and Tentative Test Dates	2
Dropping the Course	2
How to Succeed in CHEM 1320	3
Attendance Policy	3
University Policies and Procedures	4-5
Course Grading	6
Course Schedule	7

Course Description

The study of chemistry can make a worthwhile contribution to the education of any student. Chemistry is a legitimate part of a cultural education, since it leads to better understanding of a diverse range of issues, ranging from environmental to health care to forensics to geopolitics of resource use.

One must know something of science to read modern newspapers and magazines with full understanding. The extent to which chemistry influences our lives has become so great that technical topics are items of daily conversation. Chemistry is constantly providing us with a supply of new things for better living, for longer and healthier lives, and for increased leisure in which to enjoy life. Chemistry is playing an important role in the exploration of the universe. It thus becomes evident that knowledge of chemistry is an important possession of any intelligent, well-informed member of our society.

The approach of the forensic chemistry course makes it suitable for non-science, non-engineering, and non-nursing majors. The development of the subject presupposes a basic background in algebra at the high school level but does not presuppose previous training in chemistry.

Chemistry is an experimental science. Chemical knowledge has resulted from experimental observations and studies made by thousands of scientists. In the chemistry laboratory, students will examine, test, and establish for themselves the forensic chemical principles studied in class and from textbooks; will collect experimental data; and will use their reasoning to draw logical conclusions about the meaning of these data.

Course Requirements

Class will meet in RBS 4014 on Tuesdays from 1:30 -4:30 pm to starting January 16 — April 23, except Spring Break (March 11-15).

This is a hybrid course. The lab portion will be face-to-face while the lecture portion will be presented using online lecture videos available through our Canvas site. There are 6 modules (one per chapter) containing the lecture videos, PowerPoint notes, quizzes, etc. Students in this course are responsible for all of the content and material included in both face-to-face and online. Students should have all necessary materials (notes, calculator, periodic table) at each class meeting. If you are unable to attend a class meeting, all discussed material and all given assignments are your responsibility.

Student Learning Outcomes

Throughout the semester students will be required to demonstrate a working knowledge of the fundamentals of chemistry with an emphasis on forensics using Critical Thinking Skills (CT), Communication Skills (COM), Empirical and Quantitative Skills (EQS), and Teamwork (TW).

By the end of the course successful students should be able to:

1) Demonstrate critical thinking and deductive reasoning skills by collecting and analyzing mock crime-scene evidence and using the scientific method to formulate reasonable conclusions. (CT)

$$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$$

C=1		C=1
H=4	=	H=4
O=4		O=4

2) Manipulate and analyze data collected in the lab or given in lecture. (EQS)

3) Demonstrate teamwork and communication by investigating a crime scene as part of a team and submit a written report once the crime has been solved. (TW and COM)

Instructional Materials

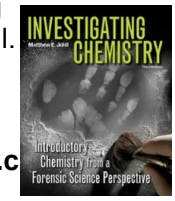
- Recommended: Investigating Chemistry by Matthew E Johll. 4th edition via E-Book Read and Practice registration link: **https://achieve.macmillanlearning.com/courses/9k5cgm**

- Required: A scientific calculator (capable of logarithms and exponents) is also required. Students may not share calculators or use cell phones as a calculator in the lab on experiments, tests or quizzes.

Required:

Lab Manual: LabPartner Chemistry Introduction to Forensic Chemistry Manual (ISBN: 9781319528102) Available for purchase at the UT Tyler Bookstore.

- Each group must purchase and maintain a bound laboratory notebook in which to generate a *permanent* record of experimental observations, notes, calculations, etc. The lab notebook must provide:



1. a label for your name and phone number/email address, or other contact information, name of the department, course, semester and section numbers, and instructor's name;

2. a table of contents page for entering experiment titles *chronologically*;

3. pages consecutively *pre-numbered*;

4. *preprinted* page headings for entering title, name, and *specific* lab section (e.g., CHEM 1320-001);

5. a *perforated*, carbonless duplicate for each page.

- *Splash-proof* safety goggles must be worn in the laboratory whenever you or your neighbors are performing experiments. (Time during your initial lab period will be allotted for purchasing goggles from your American Chemical Society Student Chapter on campus to ensure that you will be prepared to comply with this requirement.)

- Lab aprons will be made available by the department for student use, but students must also plan ahead to be clothed appropriately for laboratory work. Students must wear long pants/skirts and close toed shoes.

Warning: students will not be allowed to work in the lab without an effective apron and appropriate coverage from chest to toes! (**This means *no open-toed shoes* or extensive areas of exposed skin on your torso!**)

Failure to have the proper attire (goggles, shoes, etc.) will result in your being asked to leave the laboratory until you have the proper attire.

Tentative Topics/Tentative Test Dates

Chapter 1	Introduction to Forensic Chemistry
Chapter 2	Evidence Collection and Preservation
Chapter 3	Atomic Clues
Chapter 4	Chemical Evidence
Chapter 6	Properties of Solutions I: Aqueous Solutions
Chapter 5	Chemistry of Bonding: Structure and Function of Drug Molecules

These dates and chapters covered are tentative and are subject to change.

Midterm	**Tuesday, March 5th**
Final	**Tuesday, April 23rd**

Dropping the Course

The last day to withdraw from the course without penalty is January 29, 2024. The last day to withdraw from the course with an automatic grade of "W" is March 25, 2024. To withdraw from the course, students should initiate withdrawals with the instructor.

How to Succeed in CHEM 1320

Students must study outside of class to be successful in this course. Outside work includes watching the lecture videos, reading the textbook, carefully examining the in-chapter exercises, reviewing lecture notes, reading the study guide, etc. Typically this requires 2 or more hours for each hour of lecture. Help sessions will be conducted by the instructor throughout the semester. Do not wait until the last minute before a test to ask about material that is not understood. Form a study group, make a schedule of meetings and stick to it! The purpose of these groups are to help each other learn and to encourage each other. When you can write out the material from memory and solve problems without looking anything up, you are ready for the tests. It will take many attempts before you can expect to reproduce and use the information, so keep on rehearsing and practicing.

The grading of experiments will be based on the evaluations of students' laboratory performances, experimental results, and laboratory reports (i.e., analyses and presentations of results.)

Carefully review the experimental procedure prior to the experiment. The laboratory experiments are such that the average student can complete the work during the assigned time. This can be accomplished only if a reasonable amount of study and preparation has been done before coming to the laboratory. Plan what is to be done in each experiment before coming to the lab. It will save much time and will aid in avoiding serious mistakes.

Review your all graded materials for accuracy in grading.

Students with a grade D or F should consult with the instructor voluntarily to ascertain the reason for their low average in the course. These conferences should come as soon as possible after the grades reach this danger point in order that the students might correct their problems. **Completing the Read and Practice activities from the E-book should help improve understanding of some concepts. https://achieve.macmillanlearning.com/courses/9k5cgm**

Attendance Policy

Attendance is required. Since we only meet once every two weeks it is very crucial that you be at every meeting. Unexcused absences will result in grades of zero for any work missed during those absences. Only students with OFFICIAL excused absences will be allowed to make-up work missed during the absences. It is the students' responsibility to see the instructor to make up any work missed during absences. Students will not be allowed to attend another lab section unless they have an official excused absence.

Attendance will be taken daily and will be considered when assigning borderline grades. If you are unable to attend a lab class meeting, all discussed material and all given assignments are your responsibility. Punctuality is mandatory. Please do not interrupt class time by entering late or leaving early.

Students should bring their textbook, lab manual, notebook, pencil, calculator, and all other necessary materials to each class meeting.

Arrive *on time* and *be prepared* for each lab class meeting. **Please note: you will complete a short (< 10 min.) pre-lab quiz before each lab period.** Failure to be prepared could result in serious mistakes in carrying out the lab procedures or not being able to finish the experiment in the time allotted. (**Warning**: insufficient time in the lab period is NOT a valid reason for submitting a late or incomplete report.)

Students are required to keep a laboratory notebook of the course. This notebook is to be a complete record of all experiments performed in the lab during this semester. Do not use the report sheets to document data in the lab. Organize in a loose-leaf notebook all written information other than that contained in your lab manual or lab record book. These materials are helpful in preparing for exams and will also serve to document your grades, should the need arise to contest your average.

Bring all your materials required for lab—especially your mask, goggles, your lab manual and your lab notebook.

Maintain a clean and orderly working area. CLEAN UP AFTER YOURSELF! Students will be responsible for maintaining cleanliness in the desk areas. Students who neglect their clean-up responsibility will have their grades significantly lowered for that day's work. Therefore, it is important that students assigned to clean-up have their work approved by the lab instructor before leaving lab.

Students are responsible for laboratory equipment furnished by the Department of Chemistry. Students will be required to purchase any missing or damaged equipment.

University Policies and Procedures

To know and understand the policies that affect your rights and responsibilities as a student at UT Tyler, please follow this link: http://www.uttyler.edu/wellness/rightsresponsibilities.php

Important Covid-19 Information for Classrooms and Laboratories

The UT Tyler community of Patriots views adoption of these practices consistent with its Honor Code and a sign of good citizenship and respectful care of fellow classmates, faculty, and staff.

It is important to take the necessary precautions to ensure a healthy and successful year. UT Tyler continues to urge you to protect yourselves against the flu, COVID and any new threats that may be developing. Be diligent about preventive measures such as washing hands, covering sneezes/coughs, social distancing and vaccinations, which have proven to be successful in slowing the spread of viruses. Encourage those who don't feel well to stay home, and if they show symptoms, ask them to get tested for the flu or COVID. Self-isolation is important to reduce exposure (CDC quarantine/isolation guidelines). Please work with your faculty members to maintain coursework and please consult existing campus resources for support.

Grade Replacement/Forgiveness and Census Date Policies

Students repeating a course for grade forgiveness (grade replacement) must file a Grade Replacement Contract with the Enrollment Services Center (ADM 230) on or before the Census Date of the semester in which the course will be repeated. Grade Replacement Contracts are available in the Enrollment Services Center or at http://www.uttyler.edu/registrar. Each semester's Census Date can be found on the Contract itself, on the Academic Calendar, or in the information pamphlets published each semester by the Office of the Registrar. Failure to file a Grade Replacement Contract will result in both the original and repeated grade being used to calculate your overall grade point average. Undergraduates are eligible to exercise grade replacement for only three course repeats during their career at UT Tyler; graduates are eligible for two grade replacements. Full policy details are printed on each Grade Replacement Contract.

The Census Date is the deadline for many forms and enrollment actions of which students need to be aware. These include:

- Submitting Grade Replacement Contracts, Transient Forms, requests to withhold directory information, approvals for taking courses as Audit, Pass/Fail or Credit/No Credit.
- Receiving 100% refunds for partial withdrawals. (There is no refund for these after the Census Date)
- Schedule adjustments (section changes, adding a new class, dropping without a "W" grade)
- Being reinstated or re-enrolled in classes after being dropped for non-payment
- Completing the process for tuition exemptions or waivers through Financial Aid

State-Mandated Course Drop Policy

Texas law prohibits a student who began college for the first time in Fall 2007 or thereafter from dropping more than six courses during their entire undergraduate career. This includes courses dropped at another 2-year or 4-year Texas public college or university. For purposes of this rule, a dropped course is any course that is dropped after the census date (See Academic Calendar for the specific date). Exceptions to the 6-drop rule may be found in the catalog. Petitions for exemptions must be submitted to the Enrollment Services Center and must be accompanied by documentation of the extenuating circumstance. Please contact the Enrollment Services Center if you have any questions.

Disability/Accessibility Services

In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA) the University of Texas at Tyler offers accommodations to students with learning, physical and/or psychological disabilities. If you have a disability, including a non-visible diagnosis such as a learning disorder, chronic illness, TBI, PTSD, ADHD, or you have a history of modifications or accommodations in a previous educational environment, you are encouraged to visit https://hood.accessiblelearning.com/UTTyler and fill out the New Student application. The Student Accessibility and Resources (SAR) office will contact you when your application has been submitted and an appointment with Cynthia Lowery, Assistant Director of Student Services/ADA Coordinator. For more information, including filling out an application for services, please visit the SAR webpage at http://www.uttyler.edu/disabilityservices, the SAR office located in the University Center, # 3150 or call 903.566.7079.

Student Absence due to Religious Observance

Students who anticipate being absent from class due to a religious observance are requested to inform the instructor of such absences by the second class meeting of the semester.

Student Absence for University-Sponsored Events and Activities

If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify the instructor at least two weeks prior to the date of the planned absence. At that time the instructor will set a date and time when make-up assignments will be completed.

Social Security and FERPA Statement:

It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students have an identification number. The electronic transmission of grades (e.g., via e-mail) risks violation of the Family Educational Rights and Privacy Act; grades will not be transmitted electronically.

Emergency Exits and Evacuation:

Everyone is required to exit the building when a fire alarm goes off. Follow your instructor's directions regarding the appropriate exit. If you require assistance during an evacuation, inform your instructor in the first week of class. Do not re-enter the building unless given permission by University Police, Fire department, or Fire Prevention Services.

UT Tyler Honor Code

Every member of the UT Tyler community joins together to embrace: Honor and integrity that will not allow me to lie, cheat, or steal, nor to accept the actions of those who do.

Student Standards of Academic Conduct

Disciplinary proceedings may be initiated against any student who engages in scholastic dishonesty, including, but not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.

i. "Cheating" includes, but is not limited to:

-copying from another student's test paper;

-using, during a test, materials not authorized by the person giving the test;

-failure to comply with instructions given by the person administering the test;

-possession during a test of materials which are not authorized by the person giving the test, such as class notes or specifically designed "crib notes". The presence of textbooks constitutes a violation if they have been specifically prohibited by the person administering the test;

-using, buying, stealing, transporting, or soliciting in whole or part the contents of an unadministered test, test key, homework solution, or computer program;

-collaborating with or seeking aid from another student during a test or other assignment without authority;

-discussing the contents of an examination with another student who will take the examination;

-divulging the contents of an examination, for the purpose of preserving questions for use by another, when the instructors has designated that the examination is not to be removed from the examination room or not to be returned or to be kept by the student;

-substituting for another person, or permitting another person to substitute for oneself to take a course, a test, or any course-related assignment;

-paying or offering money or other valuable thing to, or coercing another person to obtain an unadministered test, test key, homework solution, or computer program or information about an unadministered test, test key, home solution or computer program;

-falsifying research data, laboratory reports, and/or other academic work offered for credit;

-taking, keeping, misplacing, or damaging the property of The University of Texas at Tyler, or of another, if the student knows or reasonably should know that an unfair academic advantage would be gained by such conduct; and

-misrepresenting facts, including providing false grades or resumes, for the purpose of obtaining an academic or financial benefit or injuring another student academically or financially.

ii. "Plagiarism" includes, but is not limited to, the appropriation, buying, receiving as a gift, or obtaining by any means another's work and the submission of it as one's own academic work offered for credit.

iii. "Collusion" includes, but is not limited to, the unauthorized collaboration with another person in preparing academic assignments offered for credit or collaboration with another person to commit a violation of any section of the rules on scholastic dishonesty.

iv. All written work that is submitted will be subject to review by plagiarism software.

UT Tyler Resources for Students

UT Tyler Writing Center (903.565.5995), writingcenter@uttyler.edu
UT Tyler Tutoring Center (903.565.5964), tutoring@uttyler.edu
The Mathematics Learning Center, RBN 4021, this is the open access computer lab for math students, with tutors on duty to assist students who are enrolled in early-career courses.
UT Tyler Counseling Center (903.566.7254)

Concealed Handguns on Campus

We respect the right and privacy of students 21 and over who are duly licensed to carry concealed weapons in this class. License holders are expected to behave responsibly and keep a handgun secure and concealed. More information is available at http://www.uttyler.edu/about/campus-carry/index.php

UT Tyler a Tobacco-Free University

All forms of tobacco will not be permitted on the UT Tyler main campus, branch campuses, and any property owned by UT Tyler. This applies to all members of the University community, including students, faculty, staff, University affiliates, contractors, and visitors. Forms of tobacco not permitted include cigarettes, cigars, pipes, water pipes (hookah), bidis, kreteks, electronic cigarettes, smokeless tobacco, snuff, chewing tobacco, and all other tobacco products. There are several cessation programs available to students looking to quit smoking, including counseling, quitlines, and group support. For more information on cessation programs please visit www.uttyler.edu/tobacco-free.

Course Grading

Grades will tentatively be based on a 90/80/70/60 scale, but may be adjusted based upon my evaluation of the overall class performance. Attendance, class participation, and initiative will be considered for borderline grades.

Lab Reports: Lab reports must be turned in at the end of the lab period. The Lab Report grade also reflects the instructor's subjective impression of your lab work habits, including but not limited to, punctuality, personal organization, spirit of community

Reports turned in late are subject to the loss of 5% for each 24 hour period late. Reports more than 2 weeks late will not be accepted. Reports not turned in will result in a grade of 0, so turning in a late report is better than not turning it in at all. Due dates for lab reports remain **unchanged**, even if the student must conduct the experiment on a different day than his/her assigned day.

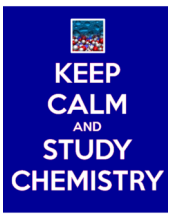
Each experiment will have a pre-lab assignment to be turned in with the report. This assignment will help students better prepare for the quiz and experiment. For the pre-lab assignment, students will need to write a short purpose of the experiment and summarize (in your own words) the procedure. If you do not have the pre-lab assignment completed, then you will be asked to sit outside the lab room until completed.

The ultimate goal of keeping a running diary of your lab work in a lab notebook is to provide enough detail for someone (including yourself) to reproduce *exactly* what you did in lab, including changes from the published procedures, so as to share or confirm your findings. To meet this goal it is important to:

1. Make all entries in ink and identify mistaken entries by drawing a *single* line through them.
2. Keep a running Table of Contents.
3. Record data *directly* into your record book *as soon as it is done or observed*! **Never write *anything* pertinent to your experimentation on Summary Report sheets or anywhere else!**
4. Always record data with their appropriate units of measurement.

You will turn in one report per group. Each member will take turns being responsible for the pre-lab, data, and discussion questions. It is expected that you work together to complete the report.

The percentage grades for this course will be weighted as follows:



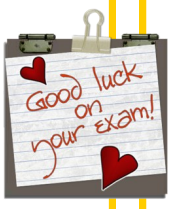
30%	Exams (2)
10%	Video Quizzes
15%	Chapter Quizzes
10%	Lab Quizzes
15%	Lap Reports
20%	Group Project
100%	**Total**

Examinations: Tests will cover material from the text, labs, class discussions, quizzes, and other assigned material. Even material in assigned chapters of the text but not discussed during class periods may appear on a test/final. Any exceptions will be announced in class. **To reiterate:** The tests are based on the lectures and lab—so don't miss a single one! **A student who does not show his/her student identification to the instructor when requested during an exam period will not receive a grade for the test/final exam.** Students are allowed only to keep pencils, eraser, calculator and identification at their desks during a test. A 3½ x 5 inch note card (handwritten, no photocopies or printed materials) is permitted for each exam. **During an exam, all other items (phones and any "smart" watch) must be inside a closed bag.**

Cell phones, smart watches**, and any similar** electronic devices must be **turned off and** put away during exams. If they are observed out in a visually accessible place (*i.e.* between legs, on the floor, *etc.*), it will be assumed that they are being used to cheat**;** your exam will be taken **away**, you will receive a zero score (0 points) for the **test**, and you will be referred to the Office of Judicial Affairs.

You must take the 2nd examination to receive a passing grade in the course.

Group Project: At the beginning of the course you will come across a mock crime scene. You will work in groups of 3-4 students to solve the crime by completing various experiments. At the end of the course you will be required to write a paper as if you were actual detectives asking a judge (the instructor) for an arrest warrant based on the evidence collected and tested.



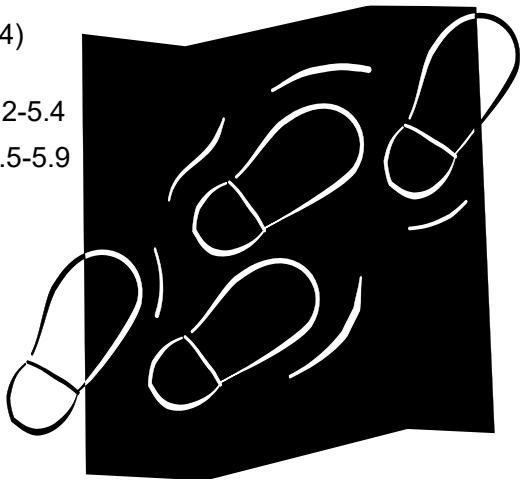
Quizzes: This is a hybrid course and as such will require you to watch the lecture material online. There will be quizzes built into the online lecture videos. These will be short (2 to 5 questions). At the end of each chapter there will be a quiz on Canvas covering the all chapter material to help you prepared for the exams. There will also be a lab quiz before each experiment.

CHEM 1320: FORENSIC CHEMISTRY I Spring 2024 SCHEDULE**

****Note: If required by unforeseen circumstances, the right to change the schedule is retained.**

X. TENTATIVE SCHEDULE WITH TEST DATES These dates/material covered are tentative and subject to change.

Date	Lecture/Laboratory Activities
Jan 16	Introduction to Lecture and the Chemistry Laboratory: Syllabus, Schedule, Laboratory Notebooks, Laboratory Reports, Safety **Video 1:** Chapter 1 Sec 1.1-1.2; **Video 2**: Chapter 1 Sec 1.3; Chapter 2 Sec 2.1; **Video 3**: Chapter 2 Sec 2.2-2.3; **Video 4**: Chapter 2 Sec 2.4-2.6;
Jan 23	*Crime Scene & Measurements (Experiment #1)
Jan 30	**Video 5**: Chapter 1 Sec 1.4-1.7; **Video 6**: Chapter 2 Sec 2.7-2.10
Feb 6	*Thin Layer Chromatography (Experiment #2)
Feb13	**Video 7**: Chapter 3 Sec 3.1-3.3; **Video 8**: Chapter 3 Sec 3.4-3.7; **Video 9**: Chapter 3 Sec 3.8-3.9; **Video 10**: Chapter 3 Sec 3.10-3.12
Feb 20	*Soil Examination (Experiment #3)
Feb 27	Exam 1 Help Session **Video 11**: Chapter 4 Sec 4.1-4.2; **Video 12**: Chapter 4 Sec 4.3; **Video 13**: Chapter 4 Sec 4.4-4.6; **Video 14**: Chapter 4 Sec 4.7-4.11
March 5	**Exam 1 (Chapters 1 – 3, Experiments 1, 2 & 3)**
March 13	**No classes meet (Spring Break)**
March 19	**Video 15**: Chapter 6 Sec 6.1-6.2; **Video 16**: Chapter 6 Sec 6.3-6.4; **Video 17**: Chapter 6 Sec 6.5-6.7; **Video 18**: Chapter 6 Sec 6.8-6.12
March 25	***Last day to drop or withdraw from a course with an automatic grade of "W"***
March 26	*Footwear Impressions and Physical Matches (Experiment #4)
Apr 2	**Video 19**: Chapter 5 Sec 5.1; **Video 20**: Chapter 5 Sec 5.2-5.4 **Video 21**: Chapter 5 Sec 5.5-5.6 **Video 22**: Chapter 5 Sec 5.5-5.9
Apr 9	*Fingerprints (Experiment #5)
Apr 16	Exam 2 Help Session, Project work day Make-up lab (if necessary)
Apr 23	**Exam 2 (Chapters 4-6, Experiments 4 &5)** **Group project report due**



*These labs will be used together to write final group lab report solving the crime found at beginning of the semester.