

# Syllabus - Forensic Chemistry

Course Number: CHEM 4351.001, .301, .302

Term: Spring 2026

## Instructor Information

**Name:** Dr. Charlie Williams (*she/her/hers*)

**Office Location:** CHEM 263

**Email:** [Charlie.williams@unt.edu](mailto:Charlie.williams@unt.edu)

**Office Hours:** T/R 10:00-11:00, W/F 9:30-10:30, or by appointment

## TA Information

TA office hours will also be posted on the Canvas Home Page during the first week of classes.

## Course Description, Structure, and Objectives

This course covers various topics in forensic chemistry such as analysis of drugs, toxicological samples, arson evidence, and more. An emphasis is placed hands on lab exercises, maintaining a detailed lab notebook, analyzing and interpreting results, and generating professional reports.

## Course Prerequisites or Other Restrictions

**Prerequisites:** CHEM 2380, 3451, & 3452 (C or better)

## Course Objectives

By the end of this course, successful students will be able to:

1. Construct a control chart and assess new data points for potential issues
2. Discuss the types of compounds that would need to be analyzed in different forensic scenarios
3. Discuss basic drug and alcohol metabolism
4. Explain the different lab methodologies commonly used in forensic chemistry
5. Create and use reagents for color tests of drugs and GSR
6. Perform separations to analyze samples or prepare samples for analysis
7. Perform instrumental analysis of drugs, ethanol, inks, trace metals, accelerant residue, and other types of chemical evidence
8. Produce a thorough, professional report

## Meeting Times and Locations

### *Lecture*

**Location:** ENV 190  
**Schedule:** M 11:00 – 11:50

### *Lab*

**Location:** CHEM 280, 283  
**Section 301 & Section 302:** TR 11:00-1:50

## Course Requirements/Schedule

Week	Dates	Meeting Descriptions	Graded Assignments Due
1	1/12 1/13 1/17	Lecture: Introduction to Forensic Chemistry NO MEETING: Complete Canvas Assignments Workshop: Writing a Lab Report ( <b>CCIL</b> )	Review Homework (30 pts) Excel Basics – LinkedIn Learning (30 pts) Workshop Activity (15 pts)
2	1/19 1/26 1/22	NO CLASS: MLK Day Lab: Check-in; Solution preparation skill-checks Workshop: Science Librarian workshop ( <b>CCIL</b> )	Skill-Check Worksheets (50 pts) Workshop Activity (15 pts)
3	1/26 1/27 1/29	Lecture: Calibration and Quality Control Lab: Balance Uncertainty, Sampling Lab Report Work Day ( <b>CCIL</b> )	Control Chart Homework (30 pts) Uncertainty Pre-Lab Quiz (10 pts)
4	2/2 2/3 2/5	Lecture: Sample preparation & separations Lab: TLC of ink NO LAB MEETING: Exam / Report Catch-up	Uncertainty Lab Report (50 pts) Ink TLC Pre-Lab Quiz (10 pts) <b>Exam 1 (Canvas) – Weeks 1-4 (100 pts)</b>
5	2/9 2/10 2/12	Lecture: Drugs – classification review, presumptive testing Lab: Presumptive drug testing reagent prep Lab: Presumptive drug testing	Ink TLC Lab Report (50 pts) Presumptive Drugs Pre-Lab Quiz (10 pts)
6	2/16 2/17-2/19	Lecture: Drugs – confirmatory testing (prep, FTIR, GC-MS) Lab: FTIR drug analysis (.301), GC-MS drug analysis (.302)	Confirmatory Drugs Pre-Lab Quiz (10 pts)
7	2/23 2/24-2/26	Lecture: Drugs – confirmatory testing (prep, FTIR, GC-MS) Lab: GC-MS drug analysis (.301), FTIR drug analysis (.302)	
8	3/2 3/3-3/5	Lecture: Clandestine synthesis, profiling NO LAB MEETING: Exam / Report Catch-up	Drug Analysis Lab Report (50 pts) <b>Exam 2 (Canvas) – Weeks 5-8 (100 pts)</b>
9	<b>3/9-3/13</b>	<b>Spring Break</b>	
10	3/16 3/17 3/19	Lecture: Introduction to forensic toxicology Lab 1: Arsenic tissue sample and calibration preparation Lab 2: ICP-OES arsenic calibration and unknown analysis	Arsenic Pre-Lab Quiz (10 pts)
11	3/23 3/24 3/26	Lecture: Ethanol toxicology Lab 1: BAC – unknown and external calibration prep Lab 2: BAC - Headspace GC-FID analysis	Arsenic Lab Report (50 pts) BAC Pre-Lab Quiz (10 pts)
12	3/30 3/31 4/2	Lecture: Urine analysis Lab 1: Solid phase extraction, external calibration prep Lab 2: LC-MS calibration and unknown analysis	BAC Lab Report (50 pts) Drug Metabolite Homework Urine Tox Pre-Lab Quiz (10 pts)
13	4/6 4/7-4/9	Lecture: Toxicology wrap-up (if needed) NO LAB MEETING: Exam / Report Catch-up	Urine Tox Lab Report (50 pts) <b>Exam 3 (Canvas) – Weeks 10-13 (100 pts)</b>
14	4/13 4/14 4/16	Lecture: accelerants, explosives Lab 1: presumptive testing Lab 2: accelerant analysis (headspace GC-MS)	Accelerant Pre-Lab Quiz (10 pts)
15	4/20 4/21-4/23	Lecture: Gunshot residue Lab: Gunshot residue analysis	Accelerant Lab Report (50 pts) GSR Pre-Lab Quiz (10 pts)
16	4/28 4/29	Lecture: Review Lab: check out; wrap up reports	GSR Lab Report (50 pts)
17	<b>5/4-5/8</b>	<b>Finals Week – No Meetings</b>	<b>Final Exam (Canvas) – Due 5/4, 11:59 PM</b>

This calendar is subject to change at any time. You will be notified via Canvas announcement as soon as possible if the calendar changes for any reason not related to a campus closure.

You will be notified by Eagle Alert if there is a campus closing that will impact a class. This calendar is subject to change accordingly, citing the [Campus Closures Policy \(https://policy.unt.edu/policy/15-006\)](https://policy.unt.edu/policy/15-006).

## Required Materials

- 1 bound lab notebook (not spiral-bound) and blue or black ink pen
- Lab safety glasses or goggles
- Scientific calculator (graphing calculators are also acceptable)
- This course has digital components. To fully participate in this class, students will need internet access to reference content (including videos) on the Canvas Learning Management System and Microsoft Word, Powerpoint, and some Excel (free with your UNT log-in). If circumstances change, you will be informed of other technical needs to access course content. Information on how to be successful in a digital learning environment can be found at [Learn Anywhere \(https://online.unt.edu/learn\)](https://online.unt.edu/learn).

## Recommended Reading

Bell, Suzanne. (2022). Forensic Chemistry (3rd ed.). CRC Press. <https://doi.org/10.4324/9780429440915>

## Assessing Your Work

### Grading Scale

Your grade for the semester will be based on the sum of points earned throughout the term.

#### Letter Grades Based on Point Totals

- A = 900+
- B = 800-899
- C = 700-799
- D = 600-699
- F = 599 and below

#### Types of Assignments

- Workshop Participation (2 x 15 pts) = 30 pts
- Pre-Lab Quizzes (10 x 10 pts) = 100 pts
- Homeworks (4 x 30 pts) = 120 pts
- Lab Reports (9 x 50 pts) = 450 pts
- Exams (4 x 100 pts) = 400 pts

There are 1100 points available throughout the semester to give you a small buffer (equivalent to 1 dropped exam or 2 dropped lab reports, for example). If you wish to secure a particular letter grade, I recommend taking advantage of all point opportunities provided.

### Late Work

Late work will be accepted until the end of the module for which it was assigned with increasing point penalties - 10% the first day, 20% the second day, up to a maximum of 50%. These penalties are designed to discourage you from procrastinating every assignment while being forgiving for times when life happens and you just can't get it done in time. Each module will close when the exam for that module is due.

Everyone gets one freebie extended deadline (not including delays due to approved absences or other accommodations) – just shoot me an email as far in advance as you can (but no later than 24 hours after the due date) and I'm happy to accommodate. Deadlines will not be extended past the relevant unit exam date except in extenuating circumstances.

## Attendance and Participation

### *Lecture*

Though I do not take attendance in lecture, research has shown that students who attend class are more likely to be successful. You should attend every class unless you have a university excused absence such as active military service, a religious holy day, or an official university function as stated in the [Student Attendance and Authorized Absences Policy \(PDF\)](https://policy.unt.edu/policy/06-039) (<https://policy.unt.edu/policy/06-039>).

### *Lab*

Lab attendance is mandatory. If you are more than 15 minutes late, you may not be allowed to participate in lab that day. Labs take a lot of time, supervision, space, and supplies to set-up and run. Therefore, full make-ups are often not possible.

There is ultimately no substitute for hands-on practice and collaboration. Excusing more than one lab per student would significantly alter the delivery of the material and impair my ability to assess your content mastery.

### *Unexcused Absences*

A maximum of one (1) lab because of an unexcused absence may be made up or waived **at my sole discretion**. Follow guidelines for university-excused absences for consideration.

### *University-Excused Absences*

Communicate with me to schedule a make-up, alternate activity, or attendance of a different section

- Preferably let me know in advance but no later than 24 hours afterwards
- Make-up must be completed within 5 school days
- Extenuating circumstances will be considered as needed
- I will work with you to arrange an abbreviated activity, alternate assignment, or have you work with a different group.
- Note - You may not switch groups without prior authorization from instructor or TA as this still requires coordination and planning for supplies and group assignments.

## Academic Integrity Policy

According to UNT Policy 06.003, Student Academic Integrity, academic dishonesty occurs when students engage in behaviors including, but not limited to cheating, fabrication, facilitating academic dishonesty, forgery, plagiarism, and sabotage. A finding of academic dishonesty may result in a range of academic penalties or sanctions ranging from admonition to expulsion from the University.

Ethical behavior is important in all scientific disciplines, but it is especially paramount in forensic science. Therefore, I adopt a zero -tolerance policy with respect to any violations of academic integrity. Any students found to be copying work, distributing quiz/exam materials, dry-labbing (making up results), writing reports using a classmate's lab results without permission, or using any material not expressly permitted during an exam will immediately result in a report to the Academic Integrity Office and a **failure of the course**.

Inappropriately citing literature (that doesn't exist, doesn't represent what you say it does, etc.) or a TurnItIn score greater than 30% may result in a request to re-complete the assignment or receiving a zero for the assignment, depending on the severity. Not citing references or figures at all will result in a zero for the assignment. Repeat instances of any of these behaviors may result in a **failure of the course**.

Honesty and accountability go a long way with me – if you are confronted about a possible academic dishonesty violation, sanctions are likely to be lighter (especially for first offenses, honest mistakes, or instances where someone else has used your work) if you are up front and take responsibility for your actions.

### Generative AI Use

Throughout the semester, you may use specific Generative AI (GenAI) tools for certain assignments, with guidance on responsible use. You won't be *required* to use it, but doing so can improve your ethical resilience and GenAI literacy, preparing you for careers in a GenAI-oriented workforce.

I use GenAI to streamline tasks, generate prompts, and create scenarios. I will always disclose how I use GenAI, and I expect the same from you. In accordance with the UNT Honor Code, unauthorized use of GenAI tools is prohibited. Using GenAI content without proper credit or substituting your own work with GenAI undermines the learning process and violates academic integrity. If you're unsure whether something is allowed, please seek clarification.

### How to Succeed in this Course

#### Be Prepared

- Set aside time EVERY week to review lecture notes, read suggested materials, prepare your lab notebook for that week's exercises, and complete the pre-lab quiz.
- Take legible, detailed notes during lab. If you take photos, take a second to label them (physically or digitally).
- Work on your lab reports and exams as early as possible rather than waiting until the due date.

#### Communicate

Connect with me and your TAs through email and/or by attending office hours. For email communications, please include 'CHEM 4351' and a brief description in the subject line.

Note - During busy times, my inbox becomes rather full, so if you contact me and do not receive a response within two business days, please send a follow up email. A gentle nudge is always appreciated!

#### Use Your Resources

##### *Academic Success Resources*

UNT strives to offer a high-quality education in a supportive environment where you can learn, grow, and thrive. As a faculty member, I am committed to supporting you, and I want to remind you that UNT offers a range of mental health and wellness services to help maintain balance and well-being. Utilizing these resources is a proactive way to support your academic and personal success. To explore campus resources designed to support you, check out [mental health services \(https://clear.unt.edu/student-support-services-policies\)](https://clear.unt.edu/student-support-services-policies), visit [unt.edu/success](https://unt.edu/success), and explore [unt.edu/wellness](https://unt.edu/wellness). To get all your enrollment and student financial-related questions answered, go to [scrappysays.unt.edu](https://scrappysays.unt.edu).

##### *ADA Accommodation*

The University of North Texas makes reasonable accommodations for students with disabilities. To request accommodations, you must first register with the Office of Disability Access (ODA) by completing an application for services and providing documentation to verify your eligibility each semester. Once your eligibility is

confirmed, you may request your letter of accommodation. ODA will then email your faculty a letter of reasonable accommodation, initiating a private discussion about your specific needs in the course. You can request accommodations at any time, but it's important to provide ODA notice to your faculty as early as possible in the semester to avoid delays in implementation. Keep in mind that you must obtain a new letter of accommodation for each semester and meet with each faculty member before accommodations can be implemented in each class. You are strongly encouraged to meet with faculty regarding your accommodations during office hours or by appointment. Faculty have the authority to ask you to discuss your letter during their designated office hours to protect your privacy. For more information and to access resources that can support your needs, refer to the [Office of Disability Access](https://studentaffairs.unt.edu/office-disability-access) website (<https://studentaffairs.unt.edu/office-disability-access>).

### Help Me Maintain an Inclusive Learning Environment

I value the many perspectives students bring to our campus. Please work with me to create a classroom culture of open communication, mutual respect, and belonging. All discussions should be respectful and civil. Although disagreements and debates are encouraged, personal attacks are unacceptable. Together, we can ensure a safe and welcoming classroom for all. If you ever feel like this is not the case, please stop by my office and let me know. We are all learning together. We will discuss our classroom's habits of engagement and I also encourage you to review UNT's student code of conduct so that we can all start with the same baseline civility understanding ([Code of Student Conduct](https://policy.unt.edu/policy/07-012)) (<https://policy.unt.edu/policy/07-012>).

### Stay Safe

While working in laboratory sessions, students enrolled in Principles of Forensic Science are required to follow proper safety procedures and guidelines in all activities requiring lifting, climbing, walking on slippery surfaces, using equipment and tools, handling chemical solutions and hot and cold products. Students should be aware that UNT is not liable for injuries incurred while students are participating in class activities. All students are encouraged to secure adequate insurance coverage in the event of accidental injury. Students who do not have insurance coverage should consider obtaining Student Health Insurance. Brochures for student insurance are available in the UNT Student Health and Wellness Center. Students who are injured during class activities may seek medical attention at the Student Health and Wellness Center at rates that are reduced compared to other medical facilities. If students have an insurance plan other than Student Health Insurance at UNT, they should be sure that the plan covers treatment at this facility. If students choose not to go to the UNT Student Health and Wellness Center, they may be transported to an emergency room at a local hospital. Students are responsible for expenses incurred there.