

Chemistry 4632
Spring 2022

- Laboratory:** M or W 1:30 – 5:20 p.m. Room 280, 283 Chemistry
- Instructor:** Dr. Teresa D. Golden (CHEM 279, tgolden@unt.edu)
- Teaching Assistants:** Alireza Aminifazl Office Hours Th 9-10 am (AlirezaAminifazl@my.unt.edu); Darshan Karunaratne Office Hours W 10-11 am (darshanj89@gmail.com); Marcus Gregory Office Hours T 11-12 pm (MarcusGregory2@my.unt.edu).
- Course Material:** Laboratory Manual (see instructor). The labs will cover spectroscopy, electrochemistry, chromatography, and selected topics. A pen, calculator, goggles, ruler, and bound lab notebook are required for every lab. All notations, calculations and results are to be included in this lab book for each experiment. The TA must sign this book at the end of each lab.
- Lab Reports:** A formal lab report will be due at the next class period for every lab. This report must include: introduction and theory, experimental section, results, discussion, calculations, graphs, answers to questions, etc. The student will not only be graded on content but also neatness and readability. No late reports will be accepted. All Instrument diagrams must be drawn by hand.
- Exams:** Lab practicum will be given.
- Grading:** The final lab grade will be calculated using the following: 10% lab book, 10% lab technique and 80% lab reports.

*Absolutely no make-up labs will be given without a signed physician's note.

Guaranteed Course Grade:

A – 90% B – 80% C – 70% D – 60% F < 60%

Additional Information:

- (a) According to University policy, the grade of I (incomplete) cannot be given as a substitute for a failing grade in a course.
- (b) Statement of ADA Compliance: The chemistry department cooperates with the Office of Disability Accommodations to make reasonable accommodations for qualified students with disabilities. If applicable, please present your request along with an official written verification from the ODA before the end of the first week of classes.

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Course Outline[‡]

<u>Week</u>	<u>Lab Assignment[*]</u>
2	Laboratory Practicum: Proper Lab Techniques, QA/QC, Assign Drawers and Glassware
3 & 4	UV Spectroscopy: Mole-ratio and Slope-ratio Method
3 & 4	UV Spectroscopy: Electronic Transitions in Organic Molecules
5 & 6	Infrared Spectroscopy: Spectra of Aldehydes and Ketones
5 & 6	Fluorescence Spectroscopy: Determination of Fluorescein in Antifreeze
7 & 8	Atomic Absorption Spectroscopy: Determination of Fe in Food
7 & 8	NMR of Various Compounds
9	Spring Break
10 & 11	Potentiometry: Ion selective electrode, Fluoride in Water and Toothpaste
10 & 11	Voltammetry: CV of Vitamin C w/ Graphite Electrodes
12 & 13	GC-FID: Hydrocarbons & Gasoline
12 & 13	GC-MS: Volatile Organics
14 & 15	HPLC-UV-vis: Caffeine Analysis
14 & 15	HPLC-UV-vis: Drug Analysis
16	Final Exam: Laboratory Practicum, QA/QC, check-out

[‡]Any student arriving more than 15 minutes after lab start time will not be allowed in the lab and will receive a zero for that lab.

^{*}The above schedule is tentative and labs may be switched depending on availability of instrumentation. Students may not be assigned labs in the order above.

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Laboratory Write-up Procedure

I. Title Page

Contains name, title of experiment, date of experiment, date due.

II. Introduction (3 to 8 pages) (30 pts)

An explanation of the experiment, including the purpose of the experiment, the general procedure, and a discussion of the basic principles involved in the instrument used (consult your book or other books in the library over the topic).

III. Instrumentation (30 pts)

Drawing of the instrumentation, or experimental set-up, label all major components. Instrument schematics must be done by hand, additional cut and paste figures can be included but cannot be substituted for the instrument schematic. This is a schematic of the inside of the instrument, such as light path, cell design, etc. Also must include a box diagram (by hand) of the instrument used with all components labeled correctly (i.e. source- xenon lamp, focusing lens, quartz sample cell, slit, PMT detector, readout, computer, etc.) and a working description.

IV. Results and Discussion (40 pts)

Results section should include all data presented in tables or graphs, at least one sample calculation of each type involved, and discussion of their accuracy, meaning, and value. All results must have units, and should be shown with their uncertainty when applicable, standard deviation being the most common. All graphs must be done in either Excel or Origin software. A least squares fit (linear regression analysis) or statistical analysis must be included. Any curve fitting analysis must be listed and explained. Discussion section should include a detailed analysis of the laboratory results and answers to lab questions.

All lab reports are due one week from the date performed and must be turned in to the TA at the beginning of lab. No late reports will be accepted.