

Chem 4190/6190 Dr. Ahuja-Summer 2019

Instrumental Methods III- Spectroscopy

Instructor: Dr. Tarushee Ahuja
Lecture (MW 9:00am-10:45am)
Lab (MW 11:00am-2:30pm)
Office: 203 Courtland North, email: tahuja1@gsu.edu
Office Hours: By appointment only.

Location: Lecture: Petit Science Center 233
Lab: Science Annex 562

Text: Principles of Instrumental Analysis, Sixth Edition, 2007
Authors: Skoog, Holler and Crouch
Publisher: Harcourt Brace Javonovich College Publisher

Online

Material: i-college

Final Exam: Wednesday, 31st July

Course

Prerequisites: Chem 4000/6000 and Chem 4120/6120 or their equivalents.

Study Tips: Attend all the classes and do homework to get better scores.

Grading: 30 min quizzes will be given during the lecture every Wednesday starting from 2nd week in the lecture class. It will be over material covered during the previous week of lecture. The lowest two quizzes scores will be dropped. No open book, but one little sheet of notes (only literature, formulas or constants values) can be brought.
The quizzes and final exam will be almost exclusively on material covered in the lecture.

The last day to withdraw with a W is July 5th 2019.

Grade Breakdown:

Lab Reports, Lab, Quizzes, notebook	30%
Lecture Quizzes	40%
Final Exam	30%

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Letter grades are assigned based on the following scale (double the marks earned):

Total Course Points Earned	Total Course Points Earned (%)	Letter Grade
>765	>95.6	A+
720-764	90.0-95.5	A
696-719	87.0-89.9	A-
684-695	85.5-86.9	B+
640-683	80.0-85.4	B
616-639	77.0-79.9	B-
584-615	73.0-76.9	C+
560-583	70.0-72.9	C
536-559	67.0-69.9	C-
480-535	60.0-66.9	D
<480	<60.0	F

Lab Class Attendance: Students are expected to attend all laboratory sessions. There is no allowance for an exemption from any chemistry experiment. You will be not allowed to do the experiment if you miss pre lab lecture.

Lab Experiments: **Unit-1 (Report 1) UV Visible-** To determine the binding affinity of the divalent metal cation Mg^{2+} to hydroxyquinoline-5-sulfonic acid (HQS) by measuring spectrophotometric changes using UV visible spectrophotometer.

Unit-2 (Report 2) Fluorescence- To study the effect of increasing concentration on 8-QBA- fructose complex solutions and establish the binding concentration via fluorescence spectra.

Unit-3 (Report 3) NMR-to study the effect of keto-enol tautomerization of acetylacetone by NMR and determine the equilibrium constant and thermodynamic parameters.

Unit-4 (Report 4) FTIR- Obtain and interpret the IR spectra of HCl

Lab Notebooks: A bound (stitched, not spiral) notebook is required and must be used for recording data and observations in all laboratory sessions. All data taken by your group must be included in your notebook. If a sample was prepared by another member of your group, you may simply state the fact in your notebook. Include copies in your notebook of all spectra presented, discussed, or reported as data in your formal laboratory reports. You must submit the laboratory notebook along with your final laboratory report. In addition, when you turn in any laboratory report, the corresponding section of your notebook must be complete and up to date. (Instructors may spot check your notebook, and any omissions

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(e.g., spectra) in the notebook may result in a lower grade on the submitted report. Graded notebooks can be picked up within one week after final semester grades are due at the registrar's office outside of the instructor's office. After that time they may be discarded.)

Safety Glasses: State law requires that you wear regular glasses or safety glasses at all times in any laboratory. Contact lenses are not safe and should not be worn. However, you can fill out a waiver of your right to sue Georgia State University and then wear them with safety glasses at your own risk.

Safety Requirement: Safety glass or goggles must be worn at all times inside the lab. Dress appropriately: no open-toe shoes (flip-flops, sandals, crocks, etc.); no very short shorts/skirts. No food, drink, gum, etc. inside the lab.

Laboratory report requirements:

- Three (3) lab reports are required for all students, covering UV-visible, fluorescence, and FT-NMR experiments.
- For students enrolled in CHEM 4190, each report (Uv-Vis, fluorescence and FT-NMR spectroscopy) will be worth 10% of the total grade for the course. The FT-IR report is optional. If a student chooses to submit four papers instead of three, the best three scores are counted in the final lab grade.
- For students enrolled in CHEM 6190, besides the above three reports, the fourth report about the work with FT-IR instrumentation is also required. Each report will be worth 7.5% of the total grade for the course.
- Students are working in groups, but are required to analyze the data and write each paper independently. IT IS NOT PERMITTED TO USE OTHER PEOPLE'S DATA/DISCUSSION IN THE PAPER WITHOUT MENTION. If that happens, it will be considered cheating and zero score will be given on this paper.
- A past-due penalty will be given, 5 pts off for each past-due day.

Policy Statement Regarding Student Integrity

The Georgia State University Policy on Academic Honesty is in force in this course, including but not necessarily limited to infractions in the areas of Plagiarism, Cheating on Examinations, Unauthorized Collaboration, Falsification, and Multiple Submissions. The university's policy is published in the *On Campus: The Student Handbook*, available to all members of the university community. Therefore, all tests taken must represent your individual unaided efforts. To receive or offer information during an examination is cheating. The use of unauthorized supplementary materials during tests is also cheating. All laboratory work performed during the lab portion of a

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course must reflect your individual effort. Only original data obtained by your own in-lab experimentation are permitted to be used, except when specifically authorized by your laboratory professor. Data from supplementary sources (handbooks, reference literature, etc.) must be clearly referenced (title, author, volume, page(s), etc.). Falsification or destruction of data constitutes cheating. Conduct or actions that disrupt class or test periods or falsification of information related to chemistry courses by any student will be taken as violation of the policies of the Board of Regents of the University System of Georgia and the GSU Student Code of Conduct, Section 6.0. Any suspected offenses may be referred to the Department Chair or the Dean of Students for appropriate disciplinary action.

University policy requires that faculty members must, on a date after the midpoint of the course to be set by the provost (or his designee) 1) give a WF to all those students who are on the roll but no longer taking the class and 2) report the last day that the student attended or turned in an assignment.

Tentative Lab Schedule

Lab Session	SCHEDULE
Lab 1	Check In
Lab 2	UV-vis Part A
Lab 3	UV-vis Part A
Lab 4	UV-vis Part B
Lab 5	UV-vis Part B
Lab 6	Catch up
Lab 7 (Report #1)	Fluorescence Or NMR
Lab 8	Fluorescence Or NMR
Lab 9	Catch up
Lab 10(Report #2)	Fluorescence Or NMR
Lab 11	Fluorescence Or NMR
Lab 12	IR
Lab 13(Report #3)	Catch up
Lab 14 (Report #4)	Check out

- Each Group contains 3-4 students.
- The IR report is due no later than the final exam.