

INSTRUMENTAL METHODS III: SPECTROSCOPY
CHEM 4190/6190 (CRN 22733/22947/22734)
2020 Spring semester (online version: 03/30/20 onwards)

Instructors

Gregory M. K. Poon, Ph.D. (Lecture)
NSC 416
gpoon@gsu.edu

Yanyi Chen, Ph.D. (Supervised laboratory)
SA 562
ychen46@gsu.edu



Time and venue

TR 11:30 – 12:20 am, via WebEx on iCollege (Lecture)
Laboratory: see supplementary guidance from Dr. Chen

Office Hours

R 10:30 – 11:30 am via WebEx on iCollege

Prerequisites

Grade C or above in CHEM 4000/6000 and CHEM4120/6120 or equivalent

Required text

Principles of Instrumental Analysis by Skoog, Holler and Crouch, 6th edition (2007), Cengage Learning, Independence, KY

Course Description

Spectroscopy in all its forms is among the most powerful experimental techniques in chemical research. This course provides a theoretical foundation and hands-on opportunities for generate and analyze data from UV/visible absorption, fluorescence, FT-NMR, and FT-IR spectroscopy in probing physical properties of chemicals and their interactions. This course complements the Physical Chemistry sequence (CHEM 4110/4111/4120/4121), Introduction to Biophysical Chemistry (CHEM 4150) and Photon Science (CHEM 4470) by focusing on the instrumental, analytical, and experimental aspects of spectroscopic investigations into chemical systems.

Learning Outcomes



Critical Thinking/Problem Solving

- analyze visual data
- identify errors in reasoning
- connect valid research to support arguments/claims
- provide useful summaries/precis

Digital Technology

- know and apply field-related technology to solve challenges
- use variety of modalities to express meaning
- create audience-appropriate layouts

Professionalism/Work Ethic

- ask and respond appropriately to questions
- meet deadlines
- accept responsibility

Teamwork/Collaboration

- collaborate in group projects
- prioritize tasks

Upon completion of this course, students will be able to:

1. Describe the physical principles of spectroscopic detection by UV, visible, and IR absorption, fluorescence, NMR;
2. Demonstrate competency in operating contemporary spectroscopic instrumentation and analyzing their output;
3. Solve quantitative problems using spectroscopic data drawn from different techniques;
4. Write ACS-style laboratory reports.

Additional course materials

Lecture slides, assignments, and additional handouts will be posted on the iCollege course page.

Attendance policy

Most of the concepts and skills taught in this course cannot be replaced by independent study outside of class. Attendance at the WebEx sessions is therefore a major component of this course. However, attendance will no longer be recorded for credit as of 03/12/20.

Grading and assessments

Tests and assignments (best 3 out of 4)	3 x 20%
Attendance (up till 03/10/20)	10%
Lab reports, lab preparation, and notebook	30%

Please refer to the laboratory syllabus (a separate document from the laboratory Instructor) for specific guidance on the laboratory assessments. Graduate students enrolled in CHEM 6190 have additional requirements over undergraduates enrolled CHEM 4190.

Students can be assured of the following grades by attaining the following scores:

94%	A+	84%	B+	74%	C+	60%	D
90%	A	80%	B	70%	C	Below 50%	F
87%	A-	77%	B-	67%	C-		

Dropped test policy

There are 4 (four) scheduled tests (or replacement assignments) in this course. The best 3 out of the 4 completed tests will be used for calculating your final score (3 x 20%). **Skipped tests that are not excused will count and will not be dropped.**

Academic honesty

The Department of Chemistry follows the University policy on academic honesty published in the "Faculty Affairs Handbook" and the "On Campus: The Undergraduate Co-Curricular Affairs Handbook". All tests taken must represent the student's individual, unaided effort. Receiving or offering information on a test is cheating, as is the use of unauthorized supplementary materials or devices. Any suspected offense may be referred to the Department Chair for further action. **The consequences of cheating are severe and potentially permanent: don't do it!**

The University requires that faculty members must, on a date after the mid-point of the course to be set by the Provost (or her designee) give a WF to all students who are on their rolls but are no longer taking the class and report the last day the student attended or turned in an assignment. Students who are withdrawn may petition the Departmental Chair for reinstatement into their classes.

Statement of student support

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. Students who wish to request accommodation for a disability may do so via the Access and Accommodations Center (AACE) at <https://access.gsu.edu/>. Students may only be accommodated upon issuance of a signed Accommodation Plan by the AACE Center (see: <https://access.gsu.edu/testing-services/>) and are responsible for providing a copy of that plan to instructors of all classes in which accommodations are sought.

Sexual harassment

In instances of sexual misconduct, the present instructor(s) and teaching assistants, are designated as Responsible Employees who are required to share with administrative officials all reports of sexual misconduct for university review. If you wish to disclose an incident of sexual misconduct confidentially, there are options on campus for you do so. For more information on this policy, please refer to the Sexual Misconduct Policy which is included in the Georgia State University Student Code of Conduct.

Basic needs statement

Any student who faces challenges securing their food or housing and believes this may affect their performance in the course is urged to contact the Dean of Students for support. Furthermore, please notify the professor if you are comfortable in doing so. This will enable us to provide resources that we may possess. The Embark program at GSU provides resources for students facing homelessness.

Course evaluation

Course evaluation will be suspended for this semester.

Course Schedule

The course syllabus provides a general plan for the course; deviations may be necessary.

Week	Session	Date	Topic	Chapter
1	1	1/14	Orientation and Introduction	6
	2	1/16		
2	3	1/21	UV/Vis absorption	7
	4	1/23		
3	5	1/28		
	6	1/30		
4	7	2/4	Test 1	
	8	2/6	UV/Vis absorption	13
5	9	2/11		
	10	2/13		14
6	11	2/18	Fluorescence	15
	12	2/20		
7	13	2/25		
	14	2/27		
8	15	3/3*	Test 2	
	16	3/5		
9	17	3/10	Fluorescence	15
	18	3/12		
10	19	3/24	No classes	
	20	3/26		
11	21	3/31	Fluorescence	15
	22	4/2	Assignment (in lieu of Test 3)	
12	23	4/7		
	24	4/9	NMR	19
13	25	4/14		
	26	4/16	IR absorption	16,17
14	27	4/21		
	28	4/23	Assignment (in lieu of Test 4)	

* Last day to withdraw and receive a W

Online via WebEx