

INSTRUMENTAL METHODS III: SPECTROSCOPY
Chemistry 4190/6190 (CRN 82810, 82813)
Fall Semester 2021

Instructors

Dr. Markus W. Germann Lecture
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Dr. Yanyi Chen Lab Session
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Course modality

This course is composed of lectures and a laboratory component, both which are on-line

Lectures: TR 5:30 pm-6:20 pm (50 min). Notes etc. will be available in iCollege

Note: Lectures are in person

Laboratory: Refer to guidance from Dr. Chen

Office Hours

Lecture: Individual consultation as requested. Email instructor to schedule

Text

Principles of Instrumental Analysis, 7th edition, 2018
Authors: Skoog, Holler and Crouch
Cengage Learning, Independence, KY
ISBN-13: 978-1-305-57721-3

Prerequisites

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

Course Description

Spectroscopy in all its forms is among the most powerful analytical techniques in experimental 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.

Course Outcomes

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 iCollege. Dr. Chen will provide materials needed for the laboratory component.

Attendance and participation policy

The Instructor with in-person classes will prepare a seating chart during the first class session. This will enable contact tracers to identify who is in “close contact” if a positive COVID-19 test is reported. **For this same reason, a daily attendance sheet is recommended.**

Students are expected to attend class if they do not have an excused absence because of illness. We have a process for students seeking excused absences through the Dean of Students Office. Students submit documentation to <https://deanofstudents.gsu.edu/student-assistance/professor-absence-notification/>

Grading and assessments

Lecture: Tests (3)	15 %
Lecture: Final Exam	25 %
Lab Reports, (and Notebook)	30 %

The tests and final examination for the lecture will be almost exclusively on material covered in the lectures, including, especially, the recommended problems.

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 laboratory requirements over undergraduates enrolled in CHEM 4190.

Students earn the following grades by attaining the following scores:

94%	A+	82%	B+	70%	C+	58%	D
90%	A	78%	B	66%	C	Below 50%	F
86%	A-	74%	B-	62%	C-		

Make-up policy, Religious Holidays

Any accommodation is strictly as agreed upon by the instructor and will be documented. Student requiring accommodation for disability should consult the statement of student support below.

<https://dei.gsu.edu/religious-observances/>

Academic honesty

The Department of Chemistry follows the University policy on academic honesty published in the “Student Code of Conduct” (<https://codeofconduct.gsu.edu/>). All assignments and tests taken must represent the student’s individual, unaided effort. Receiving or offering information on a test or assignment is cheating, including digital social media (including Facebook groups), as is the use of unauthorized supplementary materials or devices (see next section). **Any suspected offense may be referred to the Dean of Students for further action.** The consequences of cheating are severe and potentially long-lasting: don’t do it!

GSU policy prohibiting students from posting instructor-generated materials on external sites

The selling, sharing, publishing, presenting, or distributing of instructor-prepared course lecture notes, videos, audio recordings, or any other instructor-produced materials from any course for any commercial purpose is strictly prohibited unless explicit written permission is granted in advance by the course instructor. This includes posting any materials on websites such as Chegg, Course Hero, OneClass, Stuvia, StuDocu and other similar sites. Unauthorized sale or commercial distribution of such material is a violation of the instructor’s intellectual property and the privacy rights of students attending the class, and is prohibited.

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.

FERPA

In keeping with USG and university policy, this course will make every effort to maintain the privacy and accuracy of your personal information. Specifically, unless otherwise noted, it will not actively share personal

information gathered from the site with anyone except university employees whose responsibilities require access to said records. However, some information collected from the site may be subject to the Georgia Open Records Act. This means that while we do not actively share information, in some cases we may be compelled by law to release information gathered from the site. Also, the site will be managed in compliance with the Family Educational Rights and Privacy Act (FERPA), which prohibits the release of education records without student permission.

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 to 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

Your constructive assessment of this course plays an indispensable role in shaping education at Georgia State. Upon completing the course, please take time to fill out the online course evaluation. Please note that the lecture and laboratory components are not evaluated together. The lecture component is evaluated on GoSolar. The laboratory component is evaluated separately by Qualtrics with links provided outside GoSolar.

Covid

You are strongly encouraged to wear a mask during the lecture.

Should a student test COVID positive, any accommodations to the class attendance policy will be informed by evolving guidance from the CDC on quarantine. In most cases there will be no major change to mode of course delivery, so students will be responsible for collecting notes for missed in-person classes and making up any work they miss during quarantine. Anyone who has a positive COVID test is encouraged to alert the university so that appropriate contact tracing can be conducted.

For up to up to date information about Covid please consult:

<https://covidinfo.gsu.edu>

Course Schedule

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

DATE	Week	SUBJECT	READING*
8/24, 8/26	1	Introduction	Chapter 5
8/31, 9/2	2	UV-Visible	Chapter 6
9/7, 9/9	3	UV-Visible	Chapter 7
9/14, 9/16	4	Test 1, UV-Visible	Chapter 13
9/21, 9/23	5	UV-Visible	Chapter 14
9/28, 9/30	6	Fluorescence	Chapter 14/15
10/5, 10/7	7	Fluorescence, Test 2	Chapter 15
10/12, 10/14	8	Fluorescence, (Midpoint 10/12)	Chapter 15
10/19, 10/21	9	IR	Chapter 16/17
10/26, 10/28	10	IR,	Chapter 16/17
11/2, 11/4	11	Test 3, NMR	Chapter 17/18/19
11/9, 11/11	12	NMR (11/11 may be cancelled)	Chapter 19
11/16, 11/18	13	NMR	Chapter 17/18/19
11/22, 11/25	14	Thanksgiving	
11/29, 12/2	15	Review, catch up Classes end 12/6	All
12/07	16	FINAL 16:15-18:45 (2.5h)	All

The University requires that faculty members must, on a date after the midpoint of the course to be set by the Provost (or her designee) give a W 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 withdrawn may petition the Departmental Chair for reinstatement into their classes. **For the Fall 2021 semester, the semester midpoint is 10/12/2021.**

* From Skoog et al.