

Interpretation of Organic Spectra Chm 515/415 - Spring 2021

Instructor: Dr. Ralf Warmuth

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Office Hours: TBA

Lecture Time: Monday and Wednesday, 9:15 am – 10:35 am; Zoom

Course LMS: Canvas '16:160:515:01 INTERP OF ORG SPECTR'

Overview: Use of nuclear magnetic resonance, mass spectrometry, infrared and ultraviolet spectroscopy for the identification of organic compounds and the elucidation of organic reaction mechanisms. You will learn how to extract information from NMR, Mass, IR and UV/Vis spectra of organic compounds and related them to structural and/or dynamic features of these compounds. A basic understanding of mechanistic and structural organic chemistry is required.

Text Books: All textbooks can be downloaded from the Rutgers Library. See links below:

Text I: [Reichenbacher, M.; Popp, J.; Challenges in Molecular Structure Determination; Springer 2012](#)

Text II: [Gross, J. H. Mass spectrometry. A textbook.; 3rd. ed. Heidelberg, Springer 2017](#)

Text III: [Guenther, H. NMR Spectroscopy-Basic Principles, Concepts & Applications in Chemistry 2013](#)

Lecture, Notes & Recordings: Lectures will be via Zoom. To join a lecture, login the Canvas course site and click on Zoom. Then join. Please be sure that you preferred e-mail in Canvas is netID@rutgers.edu. If this is not the case, or you get an error message when attempting to join a zoom meeting follow the following link to change your preferred e-mail:

<https://canvas.rutgers.edu/documentation/external-apps/zoom-error/>

Pdfs of lecture power point slides can be downloaded from Canvas as they become available. Lectures will be recorded and will be uploaded into the Canvas Media Gallery.

Practice Problems: A number of problems/challenges from the textbooks are assigned. It is recommended, that you work through these problems, which will aid your understanding of the material and will help prepare you for the exams. Some of these problems will be solved in a lecture. Answers will be posted on Canvas.

Exams: Three midterm exams, each 100 points, will be given during a lecture period (80 min). The first exam will cover mass spectrometry. The second will cover vibrational spectroscopy and UV/Vis spectroscopy. The third exam will cover NMR spectroscopy. In Exam 2 and 3, knowledge from earlier discussed techniques may be needed, too. You will be given a take-home final (200 points), which will cover application of all techniques discussed in the course to determine the structure of unknowns and make chemical shift and/or stereochemical assignments in complex (natural) compounds.

Exam Conflicts: If you have an exam conflict, please contact R.W. at least 3 days before the scheduled exam.

Exam Schedule:

	DATE	TIME	COVERAGE	POINTS
EXAM I	2/15	9:15 am – 10:35 am	MS	100
EXAM II	3/10	9:15 am – 10:35 am	UV/Vis & FT-IR	100
EXAM III	4/14	9:15 am – 10:35 am	NMR	100
FINAL	5/6-5/9	48 h window	Unknowns, assignments	200

Grades: A good guideline is: A \geq 80%; B+ \geq 70%; B \geq 60%; C+ \geq 50%; C \geq 40%.

Missed Exam: There are no makeup exams. Exams must be taken at the scheduled times. Only excusable reasons will be considered (illness or death in the family). To be excused from an exam, you must fill out a self-reported absence form, available at <https://sims.rutgers.edu/ssra>, and notify R.W. within 24 h of the exam. Unexcused missed exams will result in a score of zero (0) for that exam. For excused exams, the score will be temporarily assigned as zero (0) and will be replaced by the average of the other exams.

Academic Integrity

Honor pledge: Students need to sign the Rutgers Honor Pledge on every major exam assignment as follows: *On my honor, I have neither received nor given any unauthorized assistance on this examination (assignment).*

Promoting a culture of academic integrity: Rutgers University takes academic dishonesty very seriously. By enrolling in this course, you assume responsibility for familiarizing yourself with the Academic Integrity Policy and the possible penalties (including suspension and expulsion) for violating the policy.

Please review the [Academic Integrity Policy](#)

As per the policy, all suspected violations will be reported to the Office of Student Conduct. Academic dishonesty includes (but is not limited to):

- Cheating
- Plagiarism
- Aiding others in committing a violation or allowing others to use your work
- Failure to cite sources correctly
- Fabrication
- Using another person's ideas or words without attribution—re-using a previous assignment
- Unauthorized collaboration
- Sabotaging another student's work in doubt, please consult the instructor

Reporting infractions of the honor code is both your responsibility and the instructors. Use of external website resources such as Chegg.com or others to obtain solutions to homework assignments, quizzes, or exams is cheating and a violation of the University Academic Integrity policy. Cheating in the course may result in grade penalties, disciplinary sanctions or educational sanctions. Posting homework assignments, or exams, to external sites without the instructor's permission may be a violation of copyright and may constitute the facilitation of dishonesty, which may result in the same penalties as plain cheating.

Protecting the intellectual property of students and instructors: Almost all original work is the intellectual property of its authors. These works may include syllabi, lecture slides, recorded lectures, homework problems, exams, and other materials, in either printed or electronic form. The authors may hold copyrights in these works, which are protected by U.S. statutes. Copying this work or posting it online without the permission of the author may violate the author's rights. More importantly, these works are the product of the author's efforts; respect for these efforts and for the author's intellectual property rights is an important value that members of the university community take seriously.

For more instructions on copyright protections at Rutgers University, please refer to the [Rutgers Libraries](#).

Student-Wellness Services

Counseling, ADAP & Psychiatric Services (CAPS): (848) 932-7884 / 17 Senior Street, New Brunswick, NJ 08901 / <http://health.rutgers.edu/medical-counseling-services/counseling/>

CAPS is a University mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professionals within Rutgers Health services to support students' efforts to succeed at Rutgers University. CAPS offers a variety of services that include: individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community, and consultation and collaboration with campus partners.

Crisis Intervention:

<http://health.rutgers.edu/medical-counseling-services/counseling/crisis-intervention/>

Report a Concern: <http://health.rutgers.edu/do-something-to-help/>

Violence Prevention & Victim Assistance (VPVA): (848) 932-1181 / 3 Bartlett Street, New Brunswick, NJ 08901 / www.vpva.rutgers.edu/

The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling and advocacy for victims of sexual and relationship violence and stalking to students, staff and faculty. To reach staff during office hours when the university is open or to reach an advocate after hours, call 848-932-1181.

Disability Services: (848) 445-6800 / Lucy Stone Hall, Suite A145, Livingston Campus, 54 Joyce Kilmer Avenue, Piscataway, NJ 08854 / <https://ods.rutgers.edu/>

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: <https://ods.rutgers.edu/students/documentation-guidelines>. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: <https://ods.rutgers.edu/students/registration-form>.

Topics of Interpretation of Organic Spectra

(see detailed in Table of Content in Canvas)

<i>Topic</i>	<i>Lectures</i>
Mass Spectrometry	6
IR/Raman Spectroscopy	3
UV/Vis Spectroscopy	3
NMR Spectroscopy	11-12
Circular Dichroic Spectroscopy	(if time permits)