

 FLORIDA ATLANTIC UNIVERSITY	NEW COURSE PROPOSAL Graduate Programs		UGPC Approval _____ UFS Approval _____ SCNS Submittal _____ Confirmed _____ Banner Posted _____ Catalog _____	
	Department Chemistry and Biochemistry College College of Science (To obtain a course number, contact erudolph@fau.edu)			
Prefix CHM Number 6235	(L = Lab Course; C = Combined Lecture/Lab; add if appropriate) Lab Code C	Type of Course Lecture/Lab	Course Title Advanced Organic Spectroscopy	
Credits (Review Provost Memorandum) 3	Grading (Select One Option) Regular <input checked="" type="radio"/> Sat/UnSat <input type="radio"/>	Course Description (Syllabus must be attached; see Guidelines) The course will cover the basic theory and principles of spectroscopy as pertaining to practical methods for structural elucidation of organic compounds ('unknowns'). The unknowns will be real-world examples drawn from natural products, which are classic case studies for structural elucidation.		
Effective Date (TERM & YEAR) Spring 2025				
Prerequisites CHM2210, CHM2211		Corequisites none	Registration Controls (Major, College, Level)	
Prerequisites, Corequisites and Registration Controls are enforced for all sections of course				
Minimum qualifications needed to teach course: Member of the FAU graduate faculty and has a terminal degree in the subject area (or a closely related field.)		List textbook information in syllabus or here Organic Structure Analysis, Crews, Rodriguez, Jaspers, Oxford, 1998		
Faculty Contact/Email/Phone Lyndon West/lwest@fau.edu/297-0939		List/Attach comments from departments affected by new course HBI is supportive in offering this course to their students and no other departments/colleges are affected by this course offering since there's no similar course.		

Approved by Department Chair <u>Andrew Teplov's</u> College Curriculum Chair <u>[Signature]</u> College Dean <u>[Signature]</u> UGPC Chair _____ UGC Chair _____ Graduate College Dean _____ UFS President _____ Provost _____	Date <u>11/15/2024</u> <u>11/18/2024</u> <u>11/18/2024</u> _____ _____ _____ _____ _____
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Email this form and syllabus to UGPC@fau.edu one week before the UGPC meeting.



FLORIDA ATLANTIC UNIVERSITY

CHM 6235-001 XXXXX

Advanced Organic Spectroscopy

Date: XXXXXXXX Building: XXXXXXXXXX Room: XXXX

3 Credit(s)

Fall XXXX - 1 Full Term

Instructor Information

Lyndon West

Email: lwest@fau.edu

Office: PS 311

Office Hours: XXXXXXXXXXXXXXXX (other times by appointment only) **Phone:** 561-297-0939

Only e-mails from an FAU e-mail account will be accepted and answered. In addition, e-mails from students need to be signed with the student's full name. E-mails that do not conform to these requirements will not be answered.

Course Description

The course will cover the basic theory and principles of spectroscopy as pertaining to practical methods for structural elucidation of organic compounds ('unknowns'). The unknowns will be real-world examples drawn from natural products, which are classic case studies for structural elucidation. Problems will also be presented in class or as take-home, and solutions will be discussed in class. You will be encouraged to present different answers to the same problems, and we will discuss both correct and incorrect answers to learn how to solve real-life problems.

Prerequisites/Corequisites

Prerequisite(s): The following course:

Prerequisite: CHM 2210 and CHM 2211 with minimum grade of "C". Revise relevant chapters in your introduction organic chemistry text.

Required Texts/Materials

Organic Structure Analysis, Crews, Rodriguez, Jaspers, Oxford, 1998

Pretsch, Buhlmann, Affolter, **Structure Determination of Organic Compounds: Tables of Spectral Data**, (3rd ed.), Springer-Verlag, 2004.

"Spectroscopic Determination of Organic Compounds: Tables of Spectral Data", 7th ed. Silverstein, Webster, Kiemle, Academic, 2005

Course Objectives/Student Learning Outcomes

Course Structure: All students are expected to attend all lectures and do all assigned reading and homework in a timely manner (assignments will be posted on Canvas). The course material listed above may be covered out of order and some material may be solely assigned for homework. Material covered in lecture and assigned for homework (through textbook problems or homework assignments) is of equal importance. In addition, Chapter 9 (stereochemistry) will also be revised and extended in this course.

Learning Outcomes:

- Learn basic spectroscopy theory and principles: UV-Vis, circular dichroism, infrared spectroscopy (IR), mass spectroscopy (MS), and nuclear magnetic resonance (NMR).
- Learn advanced NMR techniques used in structure elucidation (COSY, HSQC, HMBC and NOESY).
- Problem solving skills applied to 'unknowns'.
- Stereochemical analysis (diastereomers, enantiomers). The nOe and application to solving relative stereochemistry.
- Scalar coupling, relaxation, and dipolar coupling in NMR.
- Inferences from biosynthesis, databases, use of computational aids.

Faculty Rights and Responsibilities

Florida Atlantic University respects the rights of instructors to teach and students to learn. Maintenance of these rights requires classroom conditions that do not impede their exercise. To ensure these rights, faculty members have the prerogative to:

- Establish and implement academic standards.
- Establish and enforce reasonable behavior standards in each class.

- Recommend disciplinary action for students whose behavior may be judged as disruptive under the Student Code of Conduct [University Regulation 4.007](#).

Disability Policy

In compliance with the Americans with Disabilities Act Amendments Act (ADAAA), students who require reasonable accommodations due to a disability to properly execute coursework must register with Student Accessibility Services (SAS) and follow all SAS procedures. SAS has offices across three of FAU's campuses – Boca Raton, Davie and Jupiter – however disability services are available for students on all campuses. For more information, please visit the SAS website at www.fau.edu/sas/.

Course Evaluation Method

Course Grade: The course grade is based on the total points earned from the following assessment exercises:

- Class Attendance/In class quizzes 10%
- Class Participation 5%
- Exam 1 10%
- Exam 2 10%
- Problem Sets (part 1 and 2) 10%
- Term Project Presentation and Presentation on a New NMR Method 20%
- Term Project Report 10%
- Final Exam 25%

Class Participation: Class Participation will be evaluated by the willingness of the student to participate in the in-class discussions and problem set solution solving.

Problem Sets: In class problems will be assigned weekly and will be handed in at the end of class.

Exams: Exams will be specifically designed to examine the student's general understanding of the theory and principles of spectroscopy for the structural elucidation of organic compounds.

Term Project: Determination of an Unknown

Each student will be provided with a different unknown compound (CHM 4230C students will work in groups and will be given the spectroscopic data) and will be expected to obtain a variety of spectroscopic data and determine the structure, including the relative configuration of the compound.

Presentation: The student or groups will give a 15 min. presentation to the class describing how the structure of the compound was determined. (5 slide maximum)

Report: The student will write up the spectroscopic data in ACS/thesis style format. Included in this report will be copies of the spectra that were necessary to assign the structure of the compound. Write on them the peak assignments and any other relevant information. They should be publication quality (as supporting information and/or in your thesis).

Presentation on a New NMR Method or application

Review a manuscript and prepare a presentation that describes a new NMR technique or application useful for the structure analysis of chemical structure. The presentation can describe a new modification, or an improvement of a method discussed in class or in the textbook.

When preparing your presentation consider the following:

- Principals/theory behind technique.
- Issue or problem the technique is addressing.
- How does the new technique compare to existing approaches?
- How is the technique used?
- What results were achieved?
- Advantages/Disadvantages.

Recommended Journals: Journal of Magnetic Resonance, Journal of Biomolecular NMR, Magnetic Resonance in Chemistry, Magnetic Resonance Quarterly, and Progress in NMR Spectroscopy.

Course Schedule:

Week	Topics/Homework assignment	Other Important dates
Jan 7	1D NMR, UV, IR, MS /Problem Set 1	
Jan 14	1D NMR, UV, IR, MS /Problem Set 1	Last day to drop without a 'W' is Friday January 18th
Jan 21	2D NMR, UV, IR, MS Problem Set 1	
Jan 28	2D NMR, UV, IR, MS /Problem Set 1	
Feb 4	2D NMR, UV, IR, MS /Problem Set 1/work on term project	
Feb 11	Stereochemistry Problem Set 2/work on term project	
Feb 18	Stereochemistry Problem Set 2/work on term project	
Feb 25	Exam I	Last day to drop without an 'F' is Friday March 1st
Mar 4	Advanced 2D NMR, UV, IR, MS Problem Set 2/work on term project	Spring Break (no classes)
Mar 11	Advanced 2D NMR, UV, IR, MS Problem Set 2/work on term project	
Mar 18	Advanced 2D NMR, UV, IR, MS Problem Set 2/work on term project	
Mar 25	Advanced 2D NMR, UV, IR, MS Problem Set 2/work on term project	
Apr 1	Exam II	
Apr 8	Advanced 2D NMR, UV, IR, MS Problem Set 2/work on term project	
Apr 15	No Class No Office Hours	Work on Final Project
Apr 22	FINAL Presentations	Write-up due by 4 pm

Extra Credit: Extra credit may be given at the instructor's discretion and may consist of, but is not limited to: on-line quizzes or homework assignments. Any posting of extra credit marks on Canvas must be checked and if necessary queried by students within 14 days of the marks being posted on Canvas. Hence, if a student does not check their extra credit marks within that period and notices a mistake later in the semester unfortunately their extra credit grade will not be checked or adjusted.

Code of Academic Integrity

Students at Florida Atlantic University are expected to maintain the highest ethical standards. Academic dishonesty is considered a serious breach of these ethical standards, because it interferes with the university mission to provide a high-quality education in which no student enjoys an unfair advantage over any other. Academic dishonesty is also destructive of the university community, which is grounded in a system of mutual trust and places high value on personal integrity and individual responsibility. Harsh penalties are associated with academic dishonesty. For more information, see [University Regulation 4.001](#).

Attendance Policy Statement

Students are expected to attend all their scheduled University classes and to satisfy all academic objectives as outlined by the instructor. The effect of absences upon grades is determined by the instructor, and the University reserves the right to deal at any time with individual cases of nonattendance. Students are responsible for arranging to make up work missed because of legitimate class absence, such as illness, family emergencies, military obligation, court-imposed legal obligations, or participation in University-approved activities. Examples of University-approved reasons for absences include participating on an athletic or scholastic team, musical and theatrical performances, and debate activities. It is the student's responsibility to give the instructor notice prior to any anticipated absences and within a reasonable amount of time after an unanticipated absence, ordinarily by the next scheduled class meeting. Instructors must allow each student who is absent for a University-approved reason the opportunity to make up work missed without any reduction in the student's final course grade as a direct result of such absence.

Last Day to Drop/Add is XXXXX; Last day to drop without late fees is XXXXX; Last day to drop with a W is XXXXX; Reading Days XXXXX.

Official Holidays (2024):

XXXXXX

Religious Accommodation Policy Statement

In accordance with the rules of the Florida Board of Education and Florida law, students have the right to reasonable accommodations from the University in order to observe religious practices and beliefs regarding admissions, registration, class attendance, and the scheduling of examinations and work assignments.

University Regulation 2.007, Religious Observances, sets forth this policy for FAU and may be accessed on the FAU website at www.fau.edu/regulations.

Any student who feels aggrieved regarding religious accommodations may present a grievance to the executive director of The Office of Civil Rights and Title IX. Any such grievances will follow Florida Atlantic University's established grievance procedure regarding alleged discrimination.

Time Commitment Per Credit Hour

For traditionally delivered courses, not less than one (1) hour of classroom or direct faculty instruction each week for fifteen (15) weeks per Fall or Spring semester, and a minimum of two (2) hours of out-of-class student work for each credit hour. Equivalent time and effort are required for Summer Semesters, which usually have a shortened timeframe. Fully Online courses, hybrid, shortened, intensive format courses, and other non-traditional modes of delivery will demonstrate equivalent time and effort.

Course Grading Scale

Letter Grade	Letter Grade
A	94 - 100%
A-	90 - 93%
B+	87 - 89%
B	83 - 86%
B-	80 - 82%
C+	77 - 79%
Letter Grade	Letter Grade
C	73 - 76%
C-	70 - 72%
D+	67 - 69%
D	63 - 66%
D-	60 - 62%
F	Below 60

Grade Appeal Process

You may request a review of the final course grade when you believe that one of the following conditions apply:

- There was a computational or recording error in the grading.
- The grading process used non-academic criteria.
- There was a gross violation of the instructor's own grading system.

[University Regulation 4.002](#) of the University Regulations contains information on the grade appeals process

Policy on Make-up Tests, Late work, and Incompletes

There will be no make-up exams, except in cases of extreme emergencies where a student does not sit a given exam AND suffers one of the following emergencies:

Acceptable Extreme Emergencies AS Defined By Fau Policy Are:

1. Medical emergency or problem
2. Death in the immediate family
3. Participation in an FAU-sponsored academic or athletic activity/event
4. Required appearance in a civil or criminal court
5. Religious Holiday

A request for exemption from the exam policy for any of the above reasons will be considered only if the student does not attempt a given exam AND written documentation (e.g. medical certificate etc.) is submitted to the Instructor within 2 days (before or after) of the scheduled exam date.

Any make-up exam may be cumulative. The length of the make-up exam is at the professors' discretion. If a student fails to attend a pre-arranged/scheduled make-up exam that student will receive a zero for the make-up exam.

Policy on the Recording of Lectures

Students enrolled in this course may record video or audio of class lectures for their own personal educational use. A class lecture is defined as a formal or methodical oral presentation as part of a university course intended to present information or teach students about a particular subject. Recording class activities other than class lectures, including but not limited to student presentations (whether individually or as part of a group), class discussion (except when incidental to and incorporated within a class lecture), labs, clinical presentations such as patient history, academic exercises involving student participation, test or examination administrations, field trips, and private conversations between students in the class or between a student and

the lecturer, is prohibited. Recordings may not be used as a substitute for class participation or class attendance and may not be published or shared without the written consent of the faculty member. Failure to adhere to these requirements may constitute a violation of the University's Student Code of Conduct and/or the Code of Academic Integrity.

Counseling and Psychological Services (CAPS) Center

Life as a university student can be challenging physically, mentally and emotionally. Students who find stress negatively affecting their ability to achieve academic or personal goals may wish to consider utilizing FAU's Counseling and Psychological Services (CAPS) Center. CAPS provides FAU students a range of services—individual therapy, group therapy, and crisis services, to name a few—offered to help improve and maintain emotional well-being. For more information, go to <http://www.fau.edu/counseling/>

Student Support Services and Online Resources

[Speaking Center](#)

[Student Accessibility Services](#)

[Student Athlete Success Center \(SASC\)](#)

[Testing and Certification](#)

[Test Preparation](#)

Salvatore Lepore

From: Lyndon West
Sent: Thursday, November 14, 2024 10:32 AM
To: Salvatore Lepore
Subject: Re: New Course Proposal Forms
Attachments: CHM 6235-001 - Advanced Spectroscopy - West, Lyndon-final.docx; CHM 4230C-001 - Organic Spectroscopy - West, Lyndon-final.docx

Hi Salvatore,

Please find attached the two course syllabi for **CHM 4230C (Organic Spectroscopy)** and **CHM 6235 (Advanced Organic Spectroscopy)** detailing the differences between the undergraduate and graduate courses. I have summarized the differences below:

Course Differences:

- 1) Complexity of the molecules used for characterization** (mono- and di-functional vs multi-functional organic molecules).
- 2) Term project presentation and report: Determination of an unknown molecule.** In **CHM 6235** each graduate student will be provided with a different unknown compound and are expected to obtain the spectroscopic data (NMR, IR, UV and MS) for the compound using Departmental instrumentation. In **CHM 4230C** students will work in groups and be given the spectroscopic data for the unknown compound.
- 3) CHM 6235C** students are also expected to review and present a paper on a new NMR method or application.

These differences are reflected in the course grade.

Organic Spectroscopy CHM 4230C:

Course Grade: The course grade is based on the total points actually earned from the following assessment exercises:

Class Attendance/In class Quizzes 10%

Class Participation 5%

Exam 1 10%

Exam 2 10%

Problem Sets (part 1, 2 and 3) 10%

Term Project Group Presentation 20%

Term Project Group Report 10%

Final Exam 25%

Advanced Organic Spectroscopy CHM 6235:

Course Grade: The course grade is based on the total points actually earned from the following assessment exercises:

Class Attendance/In class quizzes 10%

Class Participation 5%

Exam 1 10%

Exam 2 10%

Problem Sets (part 1 and 2) 10%

Term Project Presentation and Presentation on a New NMR Method 20%

Term Project Report 10%

Final Exam 25%

Regards,
Lyndon

