Practical Nuclear Magnetic Resonance Spectroscopy

1. Course information:

Course number: F419

2 credits Offered Spring semesters

Prerequisites: CHEM 321 or instructor permission

Location:

Lectures will be in REIC 207

Labs will be in REIC 136 for NMR time and REIC 132 will be available for

7. Instructional Methods:

Weekly lectures will focus on safe use of the NMR instruments, the theory of how the instruments work, and analysis of NMR spectra. The laboratory meetings will focus on training students to operate the instruments. As students complete training they will be given user accounts on the NMR instruments to start pursuing their own research project. For spectral analysis access to a personal laptop is recommended, but not required.

8. **Course calendar (tentative):**

Lecture Day	Lecture	Lab
1/14/2020	NMR Basics, Safety, and Review	
1/21/2020	Intramolecular Interactions	Lab 1, Learning the 300 MHz NMR
1/28/2020	Project Expectations	Lab 1, Learning the 300 MHz NMR Liquid Nitrogen Safety Meet in 136
2/4/2020	Magic Angle Spinning and SSNMR	Lab 2, Learning the 600 MHz NMR
2/11/2020	How NMR Works	Lab 2, Learning the 600 MHz NMR
2/18/2020	Spectral Interpretation	Lab 3, Solving an Unknown
2/25/2020	Challenges to Interpretation	Lab 3, Solving an Unknown
3/3/2020	Spectral Interpretation	Projects
3/10/2020	Spring Break	
3/17/2020	Relaxation, Decoupling, and Solvent Suppression	Projects
3/24/2020	Advanced Theory	Projects
3/31/2020	Interpretation Practice	Projects
4/7/2020	Interpretation Practice	Projects
4/14/2020	Review and Project Presentation Overview	Projects
4/21/2020	Final Exam	Projects
4/28-5/2		Presentations (Time TBD)

9. Course policies:

Attendance at all lectures and scheduled lab times is expected and required. For the research projects, NMR usage will be scheduled based on need and availability of the instruments. When students sign up for an NMR time slot they are expected to use that time.

For all instrument use, students are expected to schedule time to come in on their own to use the NMR for the lab activities or projects. The three lab activities are each scheduled for two weeks to allow students ample time to get familiar with the instrument and complete the expectations of the activity. Time for the labs and project is expected to average 3 hours per week, but will be scheduled based on student and instrument availability. Total lab time for the semester should not exceed 42 hours.

Late Work: All work is due by the end of the business day on the due date of the assignment. Any work turned after that will be penalized 10% per weekday until it is turned in. No matter how late work may always be turned in and worth up to one (1) point.

10. Evaluation:

8 homework assignments (20 points each): 160 points total

Final Project/Presentation: 100 points

3 Labs (60 points each): 180 Points total

Final exam: 100 points

Participation: 60 points (based on attendance and involvement with class discussions)

Total Points: 600

Grades will be letter grades without +/- modifiers following the cutoff values listed below.

540 points = A

480 points = B

420 points = C

360 points =

The final project will be graded as follows:

Criterion	Points
Lab Performance	20
Effective Application of NMR to your project	20
Project Plan (Due March 1)	20
Presentation	
Layout	10
Quality of Figures	15
Does it tell a story	15
Total	100