

Chemistry 334L Course Syllabus

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Chem 332 and 334L are co-requisite courses, i.e., students in Chem 334L are required to take Chem 332 at the same time or to have already received credit in 332. Co-requisite course requirements are strictly enforced: Students who do not meet the co-requisite should drop the course or **they will receive an F in the course.** Students who drop or audit Chem 332 will be required to drop 334L.

Learning Objectives

The main goal of the 333L-334L sequence is to prepare you for research in a synthetic organic research lab. As such, you will learn and perform a wide variety of useful techniques and syntheses. You will be expected to interpret and describe your results in a professional manner.

Required Personal Protective Equipment (PPE)

- **Safety Eyewear:** UVEX — Model S040C Safety Glasses or Jones & Co. Visorgogs or Magid Glove and Safety Manufacturing “Sapphire” safety glasses. Safety eyewear may be purchased at the bookstore. Other types of protective eyewear require approval from course instructor.
- **Lab coat:** A mid-thigh or longer lab coat must be purchased. These are available at the bookstore, chemstores in 1400 Gilman Hall (credit card), and various online stores such as Amazon.
- **Additional PPE:** gloves (provided), and closed-toe, closed-heel shoes.

Course Materials

You will be using digital Signals Lab Notebook provided by the chemistry department.

New this semester: Signals Lab Reports will need to be exported as PDFs and submitted on Canvas.

All required lab readings and supplemental information are posted on Canvas.

Assessments

Safety

- Signed Safety Contract (5 pts)
 - Read the safety contract available via link on the 334L day 1 module. Download and sign using the draw tool in Microsoft Word. Submit using the provided link on the day 1 module.

Lab Reports (40 pts ea)

- For each experiment, you will create an experiment in your Signals Lab Notebook using templates as instructed. Each experiment will have Pre-lab, In-lab, Data and Analysis, and sometimes Evaluation sections. Your TA will give details on your first day of class.

Projects

- Multistep Synthesis Project
 - Proposal (40 pts)
 - Report (40 pts)

Detailed information for the projects can be found on Canvas in the corresponding module.

Drops

At the end of the semester, two LabNotes (pre-lab and in-lab notes), and two Analysis Questions scores will be dropped. These drops are provided to account for such things for conflicting evening exams, required performances, class trips, extracurricular activity conflicts, illness and emergencies. If you miss two lab classes due to required academic events (e.g. evening exam) or a documented health/emergency issue, and find you have an additional conflict with your lab class, email your course instructor as soon as possible (preferably before missing a third lab) to discuss alternatives.

The project and required lab check-out will not be dropped. If you have a conflict due to an academically required event or documented health/emergency issue, email your course instructor as soon as possible to discuss alternatives.

The remaining scores after your two drops will be used to calculate the final grade.

Grading

Grading scale for final grades: A \geq 93%, A- \geq 90%, B+ \geq 87%, B \geq 83%, B- \geq 80%, C+ \geq 77%, C \geq 73%, C- \geq 70%, D+ \geq 67%, D \geq 63%, and D- \geq 60%, and F < 60%. Grades are round up at the end of the semester. (e.g. 92.5% = A)

Missed Experiments

There are NO MAKE-UP experiments. In addition, **you MUST attend your assigned lab section unless you have permission otherwise.** You cannot submit LabNotes or Analysis Questions for experiments you did not perform unless you have permission. **If you need to miss lab due to serious issue beyond your control, email your course instructor and TA asap to discuss alternatives.**

Important Course Policies

1. **It is the student's responsibility to make sure that submissions are properly uploaded/submitted by the deadline. In case of technical problems, please email your TA or Instructor IMMEDIATELY.** Do not wait until the next day.
2. It is the student's responsibility to check grades on Canvas on a weekly basis.
3. **Any complaint on a grade MUST be brought up within 1 week of receiving graded work to have the grade corrected.**
4. Use of personal electronic devices of any type (e.g., laptops) is strongly discouraged in the lab. If you choose to use your own personal device, you do so at your own risk since it is a lab environment. Music streaming is not allowed without permission since doing so is distracting to some students.
5. Presence at Lab Check-out is mandatory. Lab Check-out must be done on the scheduled day at the scheduled time. **Failure to check-out will result in 0 points on an undropped Analysis Question submission unless you have permission to be absent due to a serious issue beyond your control.**

Accessibility and Mental Health Support

Iowa State University is committed to assuring that all educational activities are free from discrimination and harassment based on disability status. Students requesting accommodations for a documented disability are required to work directly with staff in Student Accessibility Services (SAS) to establish eligibility and learn about related processes before accommodations will be identified. After eligibility is established, SAS staff will create and issue a Notification Letter for each course listing approved reasonable accommodations. This document will be made available to the student and instructor either electronically or in hard-copy every semester. Students and instructors are encouraged to review contents of the Notification Letters as early in the semester as possible to identify a specific, timely plan to deliver/receive the indicated accommodations. Reasonable accommodations are not retroactive in nature and are not intended to be an unfair advantage. Additional information or assistance is available online at www.sas.dso.iastate.edu, by contacting SAS staff by email at accessibility@iastate.edu, or by calling 515-294-7220. Student Accessibility Services is a unit in the Dean of Students Office located at 1076 Student Services Building.

Student Counseling Services (SCS) provides confidential prevention, intervention, information, and referral services to Iowa State students. Assistance is available for students coping with relationship problems, low self-esteem, stress, loneliness, depression, cultural differences, sexual assault recovery, childhood abuse, trauma, eating disorders, substance abuse, career/major concerns, academic motivations, and other concerns. Students can initiate services at SCS during the walk-in hours (see SCS website) or during business hours if crisis counseling is needed. Check out their website for additional information: <https://counseling.iastate.edu/>.

Academic Misconduct

Academic Misconduct in any form is in violation of ISU *Student Disciplinary Regulations* and will not be tolerated. This includes, but is not limited to: plagiarism (copying someone else's work and submitting as your own), submissions for an experiment not performed, or having someone else do your academic work. Depending on the act, a student could receive an F grade on the assignment, F grade for the course, and could be suspended or expelled from the University. See the Conduct Code at <http://www.dso.iastate.edu/ja> for more details and a full explanation of the ISU Academic Misconduct policies. In any case, the student will be reported to the Dean of the Students Office.

Freedom of Speech

Iowa State University supports and upholds the First Amendment protection of [freedom of speech](#) and the principle of [academic freedom](#) in order to foster a learning environment where open inquiry and the vigorous debate of a diversity of ideas are encouraged. Students will not be penalized for the content or viewpoints of their speech as long as student expression in a class context is germane to the subject matter of the class and conveyed in an appropriate manner.

Day	Date	Experiment
1	17-Jan	334L Intro and Safety
2	22-Jan	EAS: Bromination of Vanillin
3	24-Jan	EAS Nitration Synthesis
4	29-Jan	EAS Nitration Interpretation NMR Spectra (Review of Coupling Constants)
5	31-Jan	Friedel-Crafts Synthesis Day 1
6	5-Feb	Friedel-Crafts Synthesis Day 2
7	7-Feb	Friedel-Crafts Synthesis Day 3
8	12-Feb	Fluorene to 9-Fluoreneol Oxidation
9	14-Feb	Fluorene to 9-Fluoreneol Column
10	19-Feb	Fluorene to 9-Fluoreneol Reduction and NMR Review
11	21-Feb	Grignard Reaction
12	26-Feb	Suzuki-Miyaura Coupling
13	28-Feb	Wittig Reaction
14	4-Mar	Reductive Amination Day 1
15	6-Mar	Reductive Amination Day 2
16	11-Mar	Spring Break
17	13-Mar	Spring Break
18	18-Mar	Michael Addition and Aldol Condensation & Intro to Computational Chemistry Day 1
19	20-Mar	Michael Addition and Aldol Condensation & Intro to Computational Chemistry Day 2
20	25-Mar	Michael Addition and Aldol Condensation & Intro to Computational Chemistry Day 3
21	27-Mar	Proline Catalyzed Aldol Condensation Day 1
22	1-Apr	Diels-Alder Reaction or Proline Catalyzed Aldol Condensation Day 2
23	3-Apr	Diels-Alder Reaction or Proline Catalyzed Aldol Condensation Day 2
24	8-Apr	Project
25	10-Apr	Project
26	15-Apr	Project
27	17-Apr	Project
28	22-Apr	Project
29	24-Apr	Project
30	29-Apr	Check out (Prep Week)