

ENTERING RESEARCH I: CHEM 260

University of Wisconsin-Madison



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Course Description: This 1-credit seminar course for undergraduate students is designed to complement independent research experience(s). In this course, students will be introduced to various skills needed to succeed in research including best-practices to finding a research mentor, the roles and responsibilities of a researcher, how to critically read and analyze written and verbal scientific papers and talks, how to develop relationships that make for a successful research experience, and how to communicate and conduct ethical research. This is a highly interactive class where students will be required to share their research experiences with their classmates to obtain invaluable feedback on their progress as a scientist. This course is designed to be taken concurrently with 1-3 independent research credits (e.g. Chem 299) with a research mentor; however, any student that is preparing to get involved in research within the next year is invited to enroll.

Credit Hour Policy: This class meets for one 50-minute class period each week over the spring semester and carries the expectation that students will work on course learning activities (reading, writing, assignments, etc.) for an average of 2 hours out of the classroom for every class period. This syllabus includes additional information about meeting times and expectations for student work.

Course Learning Outcomes:

Research process and skills:

- Find and evaluate relevant primary literature and background information related to a scientific research project.
- Apply appropriate protocols for documenting research.
- Identify and engage in safe, ethical and responsible scientific research processes.
- Analyze scientific results, papers and presentations using a creative inquiry approach.
- Develop independence, resilience, and self-efficacy as a researcher.
- Identify as a researcher/scientist who can make important contributions to the scientific field.
- Demonstrate an understanding of the research process

Communication:

- Explain the main scientific focus of a research group, how members and projects of the research group are connected, and how the research contributes to new knowledge in the discipline.
- Effectively communicate scientific research by writing a 3-page paper highlighting their research or writing a review of another researchers' work that is of interest.
- Effectively presenting a 3-minute persuasive elevator speech and a formalized scientific talk on their laboratory research or on another research groups' work that is of interest.

Professional Development

- Establish and maintain a positive relationship with a research mentor by agreeing on common goals and expectations for the research experience, and revisiting those goals and expectations regularly.
- Define roles and responsibilities of a contributing research group member.
- Articulate the roles, responsibilities and skills needed for various research careers.

Course Information from the Guide:

Course Description: Seminar course designed primarily for sophomores or transfer students to begin independent research in chemistry. Taken concurrently with 1-3 research credits with faculty member. Supports independent research experience.

Requisites: None

Course Designations and Attributes: Intermediate level; counts as L&S credit

Instructional Mode: Face-to-face

Grading: Your final class grade is determined by the following categories:

In-Class Participation =	35%
Assignments =	35%
Final Research Paper =	15%
Final Research Presentation =	15%

Attendance is required. Please notify your instructor as soon as possible if you cannot attend due to sudden illness, family emergencies, etc. If you must miss a class, it will be the students' responsibility to contact a classmate to acquire any missed information, assignments, etc. Late assignments will be accepted up to 2-weeks after the established deadline; however, the assignment will automatically be docked 10% of the total points for every week it is late. All assignments will either be handed out in class or posted on the Canvas course site. Assignments must be turned in during class time.

All enrolled students should be prepared to share their thoughts on the course topic every week to gain the maximum number of in-class participation points. The Research Paper and Research Presentation will be assigned letter grades based on the instructor's assessment and the assessment from their in-class peers using established rubrics. All other assignments will be assigned a ✓⁺, ✓, ✓⁻, or -. A ✓⁺ is equivalent to an "A", a ✓ is equivalent to a "B", a ✓⁻ is equivalent to a "C", and a - is equivalent to a "D". The student's performance on all assignments throughout the semester will be tracked, leading to an average final letter grade for all assignments during the semester.

Letter grades will be assigned at the end of the semester based on your performance throughout the course. The breakdown of grades is based on a 10% scale, with partial letter grades given 2-3% off the letter grade. This scale may be adjusted downward at the end of the semester, depending on the overall class performance. It will never be adjusted upward.

A	90.0 - 100 %
A/B	88.0 - 89.9 %
B	80.0 - 87.9 %
B/C	78.0 - 79.9 %
C	70.0 - 77.9 %
D	60.0 – 69.9 %
F	< 59.9 %

Academic Integrity: By enrolling in this course, each student assumes the responsibilities of an active participant in UW-Madison’s community of scholars in which everyone’s academic work and behavior are held to the highest academic integrity standards. Academic misconduct compromises the integrity of the university. Cheating, fabrication, plagiarism, unauthorized collaboration, and helping others commit these acts are examples of academic misconduct, which can result in disciplinary action. In this course, any student caught cheating or attempting to cheat will automatically receive a zero for that assignment. A second infraction will result in a failure of the course and will be reported to the Office of Student Conduct & Community Standards. For more information, refer to studentconduct.wiscweb.wisc.edu/academic-integrity/.

Students with Disabilities: The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty [me] of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty [I], will work either directly with the student [you] or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student's educational record, is confidential and protected under FERPA. Please contact the McBurney Disability Resource Center for additional information (<http://mcburney.wisc.edu/facstaffother/faculty/syllabus.php>).

Mental Health: As a student you may experience a range of issues that can cause barriers to learning. These might include strained relationships, anxiety, high levels of stress, alcohol/drug problems, feeling down, or loss of motivation. University Health Services is here to help with these or other issues you may experience. You can learn about the free, confidential mental health services available on campus by calling 608-265-5600 or visiting uhs.wisc.edu. Help is always available.

Statement on diversity: Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals. The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background – people who as students, faculty, and staff serve Wisconsin and the world. Any conduct counter to this goal will not be tolerated in this course (<https://diversity.wisc.edu/>).

Tentative Schedule:

Dates	Topics	Assignments Due	Readings Due
Session 0 (Before start)	Finding a Research Mentor	<ul style="list-style-type: none"> Identify potential mentors 	
Session 1 Date: Jan. 24	Introduction to <i>Entering Research & Finding a Research Experience</i>	<ul style="list-style-type: none"> Identified at least 5-10 potential mentors and write a brief description of their research 	
Session 2 Date: Jan. 31	Establishing Goals & Expectations with Your Mentor	<ul style="list-style-type: none"> Submit a draft of an email you used/will use to contact researchers Research experience expectations 	<ul style="list-style-type: none"> At the Bench: A laboratory navigator
Session 3 Date: Feb. 7	Developing a Research Project	<ul style="list-style-type: none"> Letter of recommendation 	<ul style="list-style-type: none"> The importance of stupidity in scientific research
Session 4 Date: Feb. 14	Searching the Literature for Scientific Articles (session will be held in the Graduate Computer Lab, RM #1381)	<ul style="list-style-type: none"> Worksheet; investigate how and where to search for scientific literature 	<ul style="list-style-type: none"> Types of Literature
Session 5 Date: Feb. 21	Understanding Scientific Articles	<ul style="list-style-type: none"> What is in a paper? 	<ul style="list-style-type: none"> How to read Scientific Papers
Session 6 Date: Feb. 28	Documenting Your Research	<ul style="list-style-type: none"> Research documentation protocol Mentor biography Mentor-mentee contract Safety worksheet 	<ul style="list-style-type: none"> Woodward-Hoffmann Controversy
Session 7 Date: March 7	Explaining your Science	<ul style="list-style-type: none"> Scientific article critique of abstract and introduction Written and graphical abstract 	<ul style="list-style-type: none"> TED TALK—Talk nerdy to me
Session 8 Date: March 14	Research-vator Speech	<ul style="list-style-type: none"> Revised written and graphical abstract 3-minute elevator speech 	
Session 9 Date: March 21	Research-vator Speech	<ul style="list-style-type: none"> 3-minute elevator speech Scientific article critique of experimental design & results 	
Session 10 Date: April 4	Writing a Scientific Research Article	<ul style="list-style-type: none"> Rewriting example experimental section Draft of experimental design & results 	<ul style="list-style-type: none"> Acknowledging, Paraphrasing, and Quoting Sources
Session 11 Date: April 11	Who's Who in Your Research Group	<ul style="list-style-type: none"> Research group diagram Visiting peer labs Draft of background information & hypothesis or research question 	<ul style="list-style-type: none"> Maximizing your Informational Interview Investment
UNDERGRADUATE SYMPOSIUM (Friday, April 13th at Union South, 9:15-3:30 p.m.)			
Session 12 Date: April 18	How to Give a Scientific Presentation	<ul style="list-style-type: none"> Research presentation critique Draft of research paper 	
Session 13 Date: April 25	Final 5-minute Research Presentations	<ul style="list-style-type: none"> Peer review of experimental design & results Research presentations 	
CHEMISTRY POSTER SESSION (Friday, April 27th in the Chemistry Building, 4:30-6:00 p.m.)			
Session 14 Date: May 2	Final 5-minute Research Presentations/Research Experience Reflections	<ul style="list-style-type: none"> Research presentations Final Research paper Research experience reflections 	