

CHEM 195 Research Practices in Chemistry

Fall and Spring, 0 credits (Pass/Fail)

Seminars scheduled Friday 3:00-4:20 pm are optional

Coordinator: Jeff Molloy, jcmolloy@wm.edu

All undergraduate participants in the optional research activities of the Chemistry Department (CHEM 190, 290, 390, 490, 495 & 496) share responsibility for creating a safe and ethical work environment. The department is using enrollment in CHEM 195 to ensure that each student choosing to engage in our research program has appropriate introductory training.

ENROLLMENT

Enrollment in CHEM 195 is open to all W&M students. Co- or pre-enrollment in CHEM 195 is required for participation in all Chemistry Department research courses. ***Students enrolled in CHEM 190, 290, 390, 490 or 495 not meeting this requirement at the end of add/drop will be dropped out of their research course by the Registrar.***

ATTENDANCE

CHEM 195 course has no attendance requirement, but the Chemistry Department schedules seminars and other professional development activities Fridays 3:00-4:20 pm. Students that are also registered in CHEM 390, 490, 495 or 496 are required to attend seminar. To encourage professional development by attending seminars, the schedule is included on the CHEM 195 Blackboard page.

Course requirements

Successful completion of this course requires successful completion of three skill modules listed below.

- **Safety Training**
- **Responsible and Ethical Conduct of Research**
- **Search Strategies for Scientific Literature**

Safety Training

Safety training is both essential to protect your health and required by law. You have a right to know the hazards that exist in the laboratory environment, and rules and guidelines that support safe work provide a framework for protecting yourself within the lab. In order to maintain skills and comply with federal Occupational Safety and Health Administration (OSHA) requirements, safety training must be satisfactorily repeated annually to continue with research activities.

Safety training is managed using Blackboard in a separate course, Online Safety Training Spring 2022, and is divided into modules. Each module has an associated test, which must be completed with a score of $\geq 80\%$ to pass. The following modules are required: *Introductory Safety Training, Chemistry Specific Safety Training* and *Biosafety Training*.

All modules **must be completed *before*** any laboratory research activities can occur.

Responsible and Ethical Conduct of Research

Ethical conduct in research is necessary to establish trust in the results and the scientific community at large. The department uses the Collaborative Institutional Training Initiative (CITI Program) to provide training on conflict of interest and ethical conduct of research. Upon completion of each part of the training, you will receive a certificate that must be uploaded to Blackboard.

Instructions for how to register with the CITI Program, complete the training, and submit the completion certificates is available on Blackboard. In order to fulfill this requirement, you must submit completion certificates on Blackboard no later than the last day of the semester.

Search Strategies for Scientific Literature

Learning is the process of gaining information. As each individual learns, that information can be passed along to a community of interested individuals to enhance the rate of learning. Review by others acts as an essential check to prevent error and fraud. A search on the word “chemistry” in ScienceDirect, a science catalog of articles, generated 2,996,269 results on August 19, 2022; more unique results can be found in other catalogs. An understanding of how to find relevant information in the scientific literature is a critical skill that will allow you, the researcher, to find existing information on topics of interest.

You will conduct guided searches using resources found on the W&M libraries web page as well as in Blackboard. You will submit two searches, one guided and one developed based on your interests, to Blackboard no later than the last day of classes. This assignment will be available October 1.

ADDITIONAL OPTIONAL RESEARCH & PROFESSIONAL DEVELOPMENT OPPORTUNITIES

LEARN ABOUT FACULTY RESEARCH INTERESTS

The Chemistry faculty and their current research students are holding a poster session on Friday, September 2 from 2:30-3:30 pm in the ISC Atrium. The Director of Undergraduate Research (Prof. Meldrum) will be available to discuss how to get an undergraduate research position in Chemistry. In addition, an overview of research interests sorted by area of Chemistry is available (www.wm.edu/as/chemistry/faculty_research_areas/index.php). Many faculty have detailed websites highlighting their research activities as well.

STUDENT RESEARCH OPPORTUNITIES IN CHEMISTRY

Research active members of the Chemistry faculty individually recruit undergraduates to meet the needs of their ongoing research programs. Enrollment in our research course (CHEM 190, 290, 390, 490, 495 & 496) requires a commitment of roughly 4 hours/week/credit hour. We also operate a full-time ten week summer research program coinciding with W&M’s summer session. Students seeking research positions should use the Research Poster Session, faculty websites and peer networks to identify faculty conducting research of interest. Initial contact with faculty is commonly done by e-mail or during faculty office hours before the add/drop period of the desired starting semester. Volunteer participation may be possible after completing safety training at the discretion of faculty.

Interest in faculty-sponsored research is high, and therefore placement is competitive. Individual faculty take many things into consideration when selecting students including, but not limited to, academic performance, laboratory coursework completed, related experience, level of enthusiasm for their specific research program, scheduling and the distribution of ongoing students in their labs. Labs vary in size based on issues such as current funding, safety concerns and instrumentation limitations. Students are expected to develop a level of thoughtful independence while collaborating with faculty, however the faculty generally do not provide support for “student-initiated” research.

Individual faculty provide additional safety training tailored to the specific nature of activities in their research laboratories. At the discretion of individual faculty or the administration, students may be required to refresh their safety training periodically to retain the privilege of research participation.

STUDENT FUNDING FOR RESEARCH

Department support: Students chosen by Chemistry faculty for participation in our full time 10-week summer research program are paid and potentially eligible for free dormitory housing.

Monroe Scholars and other Charles Center Summer Research Grants: These grants typically support seven weeks of research. The Department endeavors to supplement student summer research awards up to the department level for students working full time for the entire ten week summer research program.

Semester Research Funding: The Charles Center administers the Semester Research Funding Program, which assists students with expenses directly related to the conduct of research that occurs during the academic year. Applications will be due in mid-November, with the exact deadline and requirements to be announced: <https://www.wm.edu/as/charlescenter/student-research/project-funding/index.php>

Conference funding: When university travel is permitted and approved in advance, conference funding applications are accepted:

<https://www.wm.edu/offices/studentleadershipdevelopment/funding/types/conferences/index.php>

DEPARTMENT SEMINAR PROGRAM

The Department anticipates hosting a combination of remote and in-person speakers during the Fall 2022 semester. Formal presentations will typically be scheduled from 3:00-4:00 pm in ISC 1127. Opportunities to meet with the speaker in a small group of other students may also be possible earlier on Fridays. CHEM 195 engagement with outside speakers is entirely optional.

RESEARCH SYMPOSIA

The Charles Center offers several opportunities for undergraduate students to present their research during the academic year. The Fall Undergraduate Research Symposium will be held on Sept. 30 in Swem Library. Information about this and other undergraduate research events can be found at <https://www.wm.edu/as/charlescenter/student-research/research-events/index.php>