

## SC496 Course Policy Statement

SC496 is a three credit research chemistry course focusing on original and innovative scientific discovery. SC496 supports all six learning outcomes of the USNA chemistry major. The weekly course time requirement is generally met with a mixture of a) six hours of laboratory and / or computational work and b) the necessary time outside of the laboratory spent working up and analyzing data, reading the literature, designing experiments, writing reports and preparing presentations. While the six hours of laboratory or computational work are scheduled, students should be flexible about when they work so as to make as much progress as possible. The semester's effort will be communicated to your peers via a seminar during the semester or a poster presentation during final exam week and a written report due on the last day of classes.

### Laboratory Safety:

Independent research may involve laboratory work outside of normal working hours. If you are going to be in the lab to do any kind of experimental work, you must have the approval of your mentor, have discussed the experimental plan with your mentor, and you must follow the rules and guidelines delineated in the Chemistry Department's Chemical Hygiene Plan. You may only work in the laboratory if the work and supervision is consistent with the expectations defined in the Chemical Hygiene Plan.

### Course Milestones:

#### *Six weeks:*

- Review the SDS sheets for chemicals and safety guidelines for the laboratory
- Revise or extend the question or hypothesis being addressed by the research
- Review and become familiar with the relevant literature
- Understand the reasons for experimental or computational design changes
- Modify or develop a new experimental or computational plan or methods to accomplish the work
- Develop experience and skills with the needed research tools (software, instruments, techniques, etc.)
- Continue data collection
- Prepare drafts of the introduction and experimental or computational sections of the written report

#### *Six week grade:*

- 30% - effort and progress made on mastery of the research tools for the project.
- 30% - development of the experimental or computational plan and / or methods.
- 40% - draft sections of the written report including introduction, hypothesis, and experimental (items 1-3, 5 and 6, on the report grading sheet).

*Twelve weeks:*

- Execution of experimental plan
- Interpretation and presentation of data (figures, spreadsheets, and tables)
- Prepare final versions of the introduction, hypothesis and experimental or computational sections of the final report
- Prepare draft data analysis section of the final report and an outline of the results and discussion sections.
- Plan for future experiments

*Twelve week grade:*

- 50% - effort and progress made on experimental work.
- 25% - understanding and mastery of the problem at hand.
- 25% - final version of introduction, hypothesis and experimental or computational sections of the written report, draft of data analysis section and outline of the results and discussion sections of written report (items 1-6, and 9, outlines for 7 and 8, on the report grading sheet).

*Final Grade:*

- 60% - effort and understanding of the project itself and how the project fits in the larger context of the scientific field.
- 40% - final written report and poster presentation.

***Learning outcomes:***

- Answer research questions by employing relevant literature, determining appropriate methods for the investigation, executing the investigation, analyzing and critically interpreting the results obtained, and applying these techniques to the design of future studies.
- Communicate the background, methods, results, analysis, and conclusions of research project effectively using oral, graphical, and written expression with a variety of audiences.
- Conduct research according to the professional and ethical standards of scientists.
- Operate as independent learners capable of self-directed intellectual growth.