CHEM 499
Bachelor’s Essay

*This is a Departmental Course Syllabus covering all sections in the Fall 2017 or Spring Term 2018*

Catalog Description: A year-long research and writing project done during the senior year under the close supervision of a mentor from the department. The student must take the initiative in seeking a mentor to help in both the design and the supervision of the project. A project proposal must be submitted in writing and approved by the department prior to registration for the course. A specific format is required for the preparation of the final document.

Course Format: The Bachelor's Essay is a year-long six-credit course that culminates in a written Bachelor's Essay. In the Department of Chemistry, it is normal that this course entails laboratory research where the student is involved in planning, implementing, completing, and disseminating the research. A student is expected to work ~9 hours per week on the project throughout the year.

Pre-requisites: There are no formal pre-requisite courses required for enrollment. However, admission to the course requires a faculty member's agreement and the approval of the department chair.

Learning outcomes:
- To use scientific literature to understand the context of a chemical problem
- To conduct appropriate experiments after consulting scientific literature
- To evaluate experimental results and propose a plan for moving the project forward
- To defend the results and interpretations of experiments in a written paper with a complete literature background of the project
- To explain a project to a scientific audience
- To justify results in a poster presentation

Attendance Policy: Students are expected to arrange and then abide by a work schedule with the faculty member. The expected hours of work will be provided in the individual addendum below and will be signed by the student. Attendance is verified through weekly updates sent to ChemResearch@cofc.edu.

Office Hours: Office hours will vary depending on the mentor's schedule in a given semester. Students should establish a regular meeting time to touch base with the faculty member and indicate this in the addendum below.

Meeting Place: Typically the student will be working independently in a faculty member's lab. The location of that lab will be identified in the addendum below.

Course Materials: Students must supply PPE (lab coat, gloves, safety glasses or goggles) and a lab notebook. The notebook becomes the property of the lab at the conclusion of the work and will not be returned to the student.

Course Expectations:
1) Students who work independently in a lab must complete the Department of Chemistry and Biochemistry Research Safety Training once a year. During the academic year, training is
conducted by the PI of the lab. In the summer, students will attend a day-long safety orientation. Each student will post their training record in their lab’s orange 3-ring binder.

2) Students must commit to a work schedule arranged with the faculty member that corresponds to a minimum of 9 hours per week.

3) Students are expected to participate in the proper care and maintenance of lab facilities and to abide by safety regulations of the department, including monthly lab safety assessments, maintenance of inventory, and adhering to all department safety policies, especially with regards to **wearing PPE at all times while in the lab. Faculty in the department will report students they observe who are not dressed in the proper PPE. Three observations will result in a failing grade and dismissal from lab.**

4) Lab notebooks are the property of the faculty mentor and must remain in the laboratory.

5) Students are responsible for carrying out the lab’s monthly safety inspections in January, February, March and April for Spring term enrollment and the September, October, November inspections in the Fall term. If multiple students in a lab are enrolled in a given semester, the work may be divided among the enrolled students.

6) Students will email their research advisor and ChemResearch@cofc.edu on Friday of each week with a brief summary of their lab work that week.

7) Students will present a poster at the CofC poster session or other venue at some point during the year-long process. A pdf file of the poster must be submitted to your mentor and ChemResearch@cofc.edu by the last day of the second semester.

8) The student must give an oral presentation of their work, preferably at a meeting. A poster is not considered an oral presentation. If no appropriate venue is available, the student may present to the faculty mentor and their research group or to a student/faculty audience arranged by the department. Note: in the fall semester, if a student presented their work at a summer group meeting and presented a poster at convocation day, one of these projects can be carried forward to satisfy a requirement for the Fall semester enrollment of 499. A pdf file of the talk must be submitted to your mentor and ChemResearch@cofc.edu by the last day of the second semester.

9) The student will complete a Bachelor’s Essay detailing the data gathered and the conclusions. The format of the essay will mimic that of a scientific journal with the following sections:

   1) Introduction: Places the research in a historical context in the field and a case for the importance of the research is made. It should be clear from reading the introduction that the student is familiar and fluent with published work in the field. A few figures are sometimes helpful here.

   2) Research Methods: Details the experimental protocols and materials used in the research. This section should not be bulleted instruction lists---use full sentences. Include details such as model number of instruments, wavelengths used, concentrations used, pH, etc. A lab mate of yours should be able to reproduce your work from what is written.

   3) Results: Itemizes experimental results in a logical order so as to build an argument for your interpretations. Graphs, data tables and spectra are included here with figure legends. Each figure should be accompanied by an explanation of why you carried out that experiment---the logic behind performing it and what you hoped to determine.

   4) Conclusion: Assembles all the data and interprets how your sequence of experiments has advanced our understanding.

   5) References: Lists all other literature cited in an ACS format.
Due Dates for Bachelor's Essay:

- **Fall (first semester):** Enrollment: By the last day of class, a draft of the introduction with references and an outline of the experimental plan for the Bachelor's essay is due. A copy is sent to your mentor and to ChemResearch@cofc.edu.

- **Spring (2nd semester):** Enrollment: A first draft of the Bachelor's Essay is due the Monday following spring break. It is expected that there may still be holes in the document if experiments are still underway. The final draft is due on the last day of class. A copy is sent to your mentor and to ChemResearch@cofc.edu.

Grading:

1. Poster (20%)
2. Oral presentation (20%)
3. Bachelor's essay (50%)
4. Attendance, safety requirements, weekly lab updates (10%)

Grading Scale:

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<tr>
<th>Score</th>
<th>Grade</th>
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<tbody>
<tr>
<td>94-100</td>
<td>A</td>
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<td>90-93</td>
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<td>87-89</td>
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<td>Below 65</td>
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Note: For the first semester of Chem 499, students are automatically awarded an IP for a grade (meaning in progress). The IP grade is changed to a final letter grade after completion of the second semester of work.

Accommodations for Disability: Any student eligible for and needing accommodations because of a disability is requested to speak with the professor during the first two weeks of class or as soon as the student has been approved for services so that reasonable accommodations can be arranged.

Academic Integrity: Students are expected to abide by the College of Charleston's Honor Code and are referred to the Student Handbook to review this policy: [http://studentaffairs.cofc.edu/honor-system/studenthandbook/index.php](http://studentaffairs.cofc.edu/honor-system/studenthandbook/index.php).

Students are also expected to abide by the Department of Chemistry and Biochemistry's Scientific Integrity Policy: [http://chemistry.cofc.edu/documents/POLICY%20ON%20SCIENTIFIC%20INTEGRITY%20-%2008-17-2017.pdf](http://chemistry.cofc.edu/documents/POLICY%20ON%20SCIENTIFIC%20INTEGRITY%20-%2008-17-2017.pdf)
Addendum: To be filled out by the student and faculty member, signed by the student, and submitted to the department office.

________________________________________________________
Student Name:

Faculty Name:

Faculty Email:

Faculty Meeting Time:

Faculty Office #/Lab#:

Title of Project:

Expected Final Project:

Expected Hours of Work:

Student Email:

Student Cell phone Number:

Emergency Contact Name and Number:

______________________________________________________
Student Signature: I understand the expectations and responsibilities of taking an independent research course in the Department of Chemistry and Biochemistry

__ ___________________________  ________________
Signature Date