Course Description: 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.

Learning outcomes:
- To use scientific literature to understand the context of a chemical problem
- To design appropriate experiments after consulting scientific literature
- To evaluate experimental results and formulate 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 learn how to give an oral presentation, either a talk or a poster, that discusses scientific results.

Requirements:
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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<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>94-100</td>
<td>A</td>
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<tr>
<td>90-93</td>
<td>A-</td>
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<tr>
<td>87-89</td>
<td>B+</td>
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<tr>
<td>83-86</td>
<td>B</td>
</tr>
<tr>
<td>80-82</td>
<td>B-</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.
Student Name:

Title of Project:

Expected Final Project:

Expected Hours of Work:

Email:

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