



## Bioengineering – Undergraduate Departmental Honors Policy Guidelines

### OVERVIEW

The Departmental Honors program provides undergraduate Bioengineering students advanced training and experience in the conduct of experimental research and professional development. One of the primary objectives of this program is to provide students additional preparation for placement in post-graduate schooling and/or to increase the probability of achieving their professional career aspirations. Departmental Honors students will take part in both mentored (faculty supervised) laboratory research and professional development activities over a minimum of two (2) semesters. In general, Departmental Honors students will be required to perform research, present their findings utilizing both oral (semester poster / oral presentations) and written formats (honors thesis) in addition to attending academic and professional development lectures/experiences. Successful completion of the Departmental Honors program upon graduation requires undergraduate bioengineering students to perform at levels significantly above and beyond the basic requirements for a non-honors undergraduate degree in Bioengineering. All forms and a description of the Bioengineering Undergraduate Departmental Honors Program can be found at <http://www.clemson.edu/cecas/departments/bioe/academics/honors/index.html>

### REQUIREMENTS FOR GRADUATING WITH DEPARTMENTAL HONORS

#### *General Requirements*

Prospective Departmental Honors students and their research advisors must fill out the Departmental Honors agreement (**Form 1**) along with a Departmental Honors syllabus (**Form 2**) at least two weeks prior to the semester in which the student wishes to start the Departmental Honors Program (this lead time is required so that the Departmental Honors committee can review the completed Forms 1&2 for appropriateness). In general, the student should enroll in the Departmental Honors program at least two semesters prior to graduation. The Departmental Honors agreement will be reviewed in a timely manner (within 14 days of receipt) by members of the Departmental Honors committee. Students and their research advisors will be notified of acceptance or denial into the Departmental Honors program. The proposed time-line of enrollment and completion of program requirements can be found in *Appendix A* at the end of this policy.

#### *Academic Requirements*

Students applying to the Departmental Honors program **must be members of the Clemson University Honors College**. Thus, Bioengineering students must have and maintain a cumulative grade point average of 3.5.

#### *Course Requirements*

**Research Principles (BIOE H4150):** It is strongly suggested that Departmental Honors students take BIOE H4150 during their first semester in the program. This course introduces Departmental Honors and senior students to principles and practices of scientific research. Topics covered include developing scientific concepts, developing projects, collaborating in multidisciplinary teams, patenting and publishing technical and scientific information

and reviewing professional and ethical standards of performance. Course completion will be tracked via **Form 3 – Section A**.

### *Research Requirements*

**Mentored Research (BIOE H4910):** This course will provide mentored research training for undergraduate Departmental Honors students working with a faculty research advisor. These students will take a total of 6 research credits (equivalent to 270 total hours of lab time) under a single research advisor. The faculty research advisor will develop a syllabus outlining the proposed research and evaluation methods (**Form 2**) prior to student admission into the Departmental Honors program. Assessment of the students' progress through the research program will be tracked via **Form 3 – Section A**. The students will learn the basic principles of scientific / engineering research including performing literature reviews, experimental design, research documentation, and presentation of results.

The BIOE 4910H research experience is meant to be mutually beneficial for both the student and the faculty mentor. Careful consideration should be made to ensure that both parties understand the expectations of the experience. Despite best efforts, on rare occasions, differences in expectations or personal style may lead to the need to find alternative BIOE 4910H arrangements. In this case, the decision to change research advisors should be documented in writing, reviewed by both the student and the faculty mentor, and reviewed by the department chair. If all parties are agreeable to making a change in research arrangements, the student should be permitted to seek a new research mentor. This mentor must be approved by the Honors committee.

**Departmental Honors Research Symposium:** Departmental Honors students will be required to actively participate in research symposia while enrolled in the program. Each honors student will have to present their research progress via one poster and one oral presentation during their enrollment. The poster presentation should be formatted in a similar manner to that of most research conferences. If students have presented posters of their honors research at professional conferences, they can reprint those posters for use at the departmental honors research symposium, but they must still attend the departmental honors research symposium. The oral presentation will be done in their final semester in the program prior to graduation. This presentation will be delivered to peers and faculty within the Department of Bioengineering during a departmental research symposium. Departmental Honors students can be exempt from their final oral presentation if they present documented proof (i.e. conference proceedings) to the honors committee that they have previously presented their honors research (via podium presentation) at a professional society meeting. If the students have presented a podium talk at a conference, they are still responsible for attending the research symposium. In general, all Departmental Honors Students must attend the research symposium held at the end of each semester while they are enrolled in the program (attendance will be taken). Posters and oral presentations will be evaluated based upon a suggested assessment rubric which can be found within the Departmental Honors Syllabus (**Form 2**) by both their research advisor and by a member of the Departmental Honors committee. A final evaluation grade will be recorded on **Form 3 – Section B** and will be signed off on by the research advisor and a Departmental Honors committee member. Additionally, a hard copy artifact (print out) of each poster and final presentation will be required so that it can be kept within the student's file for tracking progress throughout the program.

**Departmental Honors Research Thesis:** Departmental Honors students are required to complete a thesis according to the thesis content and formatting guidelines provided by the Departmental Honors committee (**Form 4**). At minimum, the thesis should include a review of literature pertinent to the students' research focus area, research aims and hypotheses, materials and methods, results, discussion and a brief description of the

conclusions that can be drawn from the research performed. The thesis must be submitted to the students' research advisor who will review the document for completeness and clarity at least one month prior to the student's intended graduation date from the undergraduate program. Following assessment by the research advisor, the thesis and assessment form will be submitted to the Departmental Honors committee for final review/approval at least two weeks prior to graduation with Departmental Honors (**Form 3 – Section D**).

#### *Professional Development Activity Requirements*

**Attendance of Scientific, Engineering or Bioengineering Seminars / Lecture Series:** Departmental Honors students will be required to attend a total of 2 bioengineering, scientific, professional and/ or entrepreneurial events (i.e. Hunter, C. Dayton Riddle, annual scientific meetings, etc.) during each of the semesters in which they are enrolled within the program. Students will be required to complete the appropriate information in **Form 3 – Section C** for the seminar and provide a 2-3 sentence summary of each seminar to illustrate their attendance at the event.

**HONORS PROGRAM PROGRESS TRACKING:** A student's progress through the Departmental Honors program will be tracked via **Form 3**. It is the responsibility of the student to update and maintain their tracking form. This form must be submitted to the Honors Committee with the student's Honors Thesis.

*Policy Statement: The policies herein outline requirements for obtaining Bioengineering Undergraduate Departmental Honors upon graduation. Any deviation from these guidelines and the referenced documents will result in the denial of departmental honors status. In extreme cases, deviations can be subject to review by the departmental honors committee for consideration of the granting of departmental honors status.*

#### **Appendix A:**

*Proposed time-line for enrollment and completion of Departmental Honors Program*

**Clemson Bioengineering Undergraduate Departmental Honors Program Time-Line**

At least two weeks prior to 1<sup>st</sup> Semester of enrollment

1<sup>st</sup> Semester in program

2<sup>nd</sup> and subsequent semesters in program

Thesis

Graduation



- **Identify and meet with potential research advisor.**
- **Complete Form 1 & 2 with advisor and submit to Honors Committee for approval.**

- Upon approval, register for BioE4910H.
- Upon approval, register for BioE4150H (if offered).

- Perform research.
- Attend BioE4150H (if offered).
- Attend two professional development seminars.
- Attend and present research update at departmental honors research symposium (poster).

- Perform research.
- Attend BioE4150H (if not available in 1<sup>st</sup> semester)
- Attend two professional development seminars.
- Attend /present research update at departmental honors research symposium (oral).
- Write research thesis and submit to advisor for review.

- Advisor to submit thesis to honors committee at least two weeks prior to graduation.