

## **BIO 496 Honors Independent Research Capstone as Biology Major Writing Intensive (W) Course**

### **Background**

Course description: May substitute for BIO 498/Biological Seminar as the capstone course, but not as a biology option course. Pursuit of an original research project under the direction of a supervising professor. Results and conclusions serve as the basis of an oral or poster presentation to faculty and students as well as a written paper that has gone through multiple drafts and submitted to the faculty mentor and archived by the Department of Biology. Students should enroll in this course during their final semester of independent research.

### **Pre-requisites**

Students must complete at least one semester of Bio493 or Bio494, as well as the Biology core curriculum (Bio201, Bio211, Bio221, Bio231).

### **Learning Goals**

In addition to the Learning Goals of Bio493/494, the central learning goal for a Biology W course is to educate our students to write original research papers and grants. To that end, students will:

1. Become well-versed in reading and interpreting original scientific literature
2. Understand how individual research papers fit into a larger scientific context and address relevant questions in a field.

### **Performance Goals and Guidelines for Honors Independent Research Capstone:**

#### Basic requirements:

- 1) attendance at laboratory meetings
- 2) maintenance of a laboratory notebook
- 3) attendance at all departmental seminars
- 4) poster presentation at COSA or equivalent scientific meeting
- 5) show evidence of elevated scholarship and/or leadership. Examples include:
  - a. Lead a lab or journal club meeting
  - b. Critique oral and/or written work of peers
  - c. Present a poster or oral presentation at a regional/national meeting or similar experience (excluding COSA)

#### Writing requirements:

For a student to complete the requirements of the course the student must produce a research paper based on laboratory research performed by the student that is suitable for publication in a scientific journal. The production of this paper requires substantial writing of a first draft (typically 15-20 pages), review of this draft by a faculty member, and final revision by the student. Students begin by writing the first draft based on extensive guidelines (see attached). This first draft is submitted and thoroughly reviewed by the professor. It is returned with substantial feedback so that students can write a second draft, building upon the comments received earlier. In total, students in either course produce more than 15 single spaced pages of finished scientific work. Original student research papers are expected to meet the following criteria:

- 1) clear and concise written exposition of the research question and its importance in the context of larger questions in the scientific discipline, supported by the primary scientific literature.
- 2) clear and concise explanation of the methods used in the study.
- 3) effective presentation and accurate analysis and interpretation of results.
- 4) effective revision based on faculty review.
- 5) thoughtful discussion of the results.

### **Guidelines for Research Paper**

The research paper is to be written in the style of a journal article, and is the culmination of your semesters of research. You will be asked to turn in an initial draft (either of individual sections, or of the entire paper) to your mentor, and you will then create a final draft based on their feedback.

The format to be followed will be suggested by your mentor, but in all cases will follow the format of the primary literature in the biological sciences (note however that different journals do require different formats, which is why you should discuss this with your mentor). Each paper should have a title page that includes: Title, your name, the name of the principal investigator, and those of any additional co-authors, the name of the host institution and department. For additional formatting tips, please refer to the Biology Style Manual which is updated annually and available electronically from the TCNJ Biology department website.