

Biology 499 Directed Senior Research Fall 2008

1. Meetings and Faculty

1.1. Meetings

Tuesdays 830-920, Henry 106

1.2. Faculty

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|------------------------|------------------------------|--------------------------|
| Coordinator | Dr Helen Turner | (hturner@chaminade.edu) |
| Research Mentors | Dr Helen Turner | |
| | Professor Ron Iwamoto | (riwamoto@chaminade.edu) |
| | Dr Michael Dohm | (mdohm@chaminade.edu) |
| | Dr Joel Kawakami | (jkawakam@chaminade.edu) |
| | Dr Alexander Stokes | (astokes@hawaii.edu) |
| | Dr Abby Collier | (acollier@hawaii.edu) |
| | Dr Joan Kuh | (joan.kuh@chmainade.edu) |
| Internship coordinator | Professor Patti Lee-Robinson | (plrobins@chaminade.edu) |

1.2. Office Hours.

Office hours with Dean Turner are by appointment. Office hours for research mentors should be established individually.

2. The Course.

2.1. Overview.

Directed Senior Research is a culmination of the course of study in biology. The steps that you follow here are quite similar to steps taken by biologists in a wide variety of research labs, from generating ideas and research proposals to collection and analysis of data and finally to the presentation of results to other scientists (including those at granting agencies) through a written publication and or a public presentation. The weekly meetings with the facilitator, Dr Turner, will be used to review project progress and to perform exercises that aim to increase your knowledge of topical issues in the realms of biological discovery, scientific ethics and recent technical advances.

2.2. Project selection process

Each faculty mentor has defined projects available. Students must perform research that is within the field of expertise of the mentor, and the mentor may refuse to supervise a topic that is not within their field. Students will select a research project, investigate literature on the topic, write a proposal for an experiment, conduct an investigation of the topic, collect and analyze the data and consider the results and the study itself in a final paper that follows the format of a scientific publication. Students will also present a poster based on their work in an open session at the end of the semester. These posters will be scored by a committee composed of the facilitator, research mentors and internship coordinator. As you select topics, please be advised that the Biology Department has adopted a moratorium on bird and mammal studies including humans.

2.3. Learning Outcomes.

Successful completion of this course should provide students with the following learning outcomes:

1. Demonstration of the ability to organize and perform biological research using the scientific method.
2. Demonstration of the ability to complete a library search of biological literature.

3. Demonstration of understanding problems involved in conducting research in biology.
4. Demonstration of the ability to critically analyze data.
5. Demonstration of competency in using biological techniques and instruments
6. Completion of writing up research as a scientific paper formatted for submission to a peer-reviewed journal.
7. Completion and presentation of a poster documenting the research project for an audience of peers and professional scientists.

3. Requirements and Grading

3.1. Grading Scheme

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| Attendance and participation in weekly meetings | 100 points |
| Final Poster Presentation | 100 points |
| Final Written Paper | 100 Points |

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| A | Excellent | >85% |
| B | Good | >75% |
| C | Average | >65% |
| D | Below Average | >55% |
| F | Failure | <55% |

3.2. Requirements for Summer Internship Students

The Biology department is aware that some students registering for the BI499 course will have performed on- or off-campus research during the summer. Where these experiences culminated in a poster presentation, that poster may be used in the BI499 session. Students are also free to modify and upgrade their posters if they wish, based on their experiences during BI499 and on the input they received during their summer presentations. If students did not produce a poster during their summer experience they are required to do so during the BI499 period. The written paper, and meeting attendance requirements also apply to Summer Internship Students.

3.3. Course requirements.

The course is composed of:

1. Weekly discussion meetings with some assignments;
2. You should aim to spend at least 10 hours per week on your research project. Be aware that this is a minimum and the nature of biological research means that it is sometimes time-consuming and unpredictable.

The required products of this course are:

1. A poster documenting your literature research project which you are required to present in our mini-symposium. A single sheet poster will be required. The poster will include title, authors and affiliations, abstract, background, methods, results and data, discussion, literature cited and acknowledgements. Powerpoint templates for poster design are recommended and will be provided on request by Dr Turner. At the mandatory poster presentation session you should be prepared to give a brief oral presentation of your poster and answer questions from faculty and your peers. This will be held on campus in week 12/13 of the semester. The date of this symposium will be announced in class.

2. A research paper formatted in accordance with the guidelines for submission to the Journal of Biological Chemistry (see http://www.jbc.org/misc/ifora.shtml#_Organization_of_the_Manuscript). Required elements of the paper are:

- **Title page:** title of your research project, your name, course and date of submission.
- **Abstract:** standard abstract form that presents your research (including results) in less than 200 words.
- **Introduction:** a review of literature, hypothesis and rationale of your research project. What is known about your area of interest and about your specific question(s)? What is not known? Where does your work fit in and contribute?
- **Methods and Materials:** a detailed description of techniques, instruments, experimental and control groups and flow-charts if needed.
- **Results:** data tables, figures, photographs and brief narrative of each.
- **Discussion and Conclusion:** a careful analysis of results, error analysis and proposals for additional work.
- **Literature Cited:** provides a complete list of work cited. Comply with the style of the Journal of Biological Chemistry.
- *The research must comply with the Chaminade University *Writing Across the Disciplines* standards.
- * The research paper must be submitted as hard copy by 4pm on Friday December 3rd at 4pm to Dr Turner's office (WCS 116) and as a PDF emailed to hturner@chaminade.edu by the same deadline.

3.4. How to keep a laboratory notebook

- Completely number pages before recording data/writing in it.
- Use permanent ink.
- Include a complete Table of Contents at the beginning; all experiments should be dated and page numbers indicated. Include your mathematical calculations.
- Cross out errors—do not erase or use Liquid Paper.
- If data for a given experiment is to be collected periodically, leave sufficient space to enter the data over time. A data table might be appropriate in this case.
- Record data directly and do not tear pages out.
- The notebook is the property of the supervising investigator and should be surrendered to them upon completion of the project.

4. Policies.

- Late assignments will not be accepted without prior written approval from the instructor.
- Students using cell phones in class will be asked to leave and will be marked as absent.
- All other academic policies specified by the University Catalog and Student Handbook 2010-2011 apply to this course.
- Details of the course may be subject to change.

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