Spring 2018: Biology 495 (Research I) and 499 (Research II)

1. Meetings and Faculty

1.1. Meetings
Wednesday, 5:30PM – 6:20PM, WSC 120

1.2. Faculty
Instructor Chrystie Naeole, PhD (chrystie.naeole@chaminade.edu)

CUH Research Mentors:
Dr. Helen Turner (Obesity and Immunology, hturner@chaminade.edu)
Dr. Michael Weichhaus (Cancer, michael.weichhaus.edu)
Dr. Michael Dohm (Environmental Toxicology, mdohm@chaminade.edu)
Dr. Claire Wright (Reproductive Health, claire.wright@chaminade.edu)
Dr. Katelynn Perrault (Forensic & Bioanalytical Chemistry, katelynn.perrault@chaminade.edu)

1.3. Office Hours
Office hours with instructor are by appointment only. Office hours for research mentors should be established individually.

2. The Course

2.1. Overview
Directed 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 or a public presentation. The weekly meetings with the facilitator 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.

You should be registered in BI495 if this is your first research semester at Chaminade
You should be registered in BI499 if this is your second research semester at Chaminade

The course has three components:

- #1. Hands-on Laboratory Research Project

  You may complete this on or off-campus. Off-campus internships are typically during the summer prior to your registration in 495 or 499. Students who complete this component off campus are still required to perform #2 and #3 below. If you wish to perform on campus research, a research mentor from the list above must accept you by the end of Week 2 of the semester. 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.

- #2: Weekly class meetings and assignments, including a final poster and/or paper.
- #3: Presentation to faculty and staff in Week 15 of the semester.

2.2 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 and presentation of a poster or paper documenting the research project for an audience of peers and professional scientists.

3. Requirements and Grading (Subject to Change as Instructor Sees Fit)

3.1. Grading Scheme

Attendance & Participation	10%
Judges Evaluation	10%
Research Supervisor Evaluation	30%
Final Product (poster & presentation)	50%

You will present a poster documenting your research project during 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.

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 15 of the semester. The date of this symposium will be announced in class.

3.2. Required elements of a research paper or poster 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 (see: www.jbc.org/site/misc/ifora.xhtml).
- The research must comply with the Chaminade University Writing Across the Disciplines standards.

3.3. 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 polices specified by the University Catalog and Student Handbook 2017-2018 apply to this course.
- Students performing research at off-campus locations are required to perform all applicable safety trainings prior to starting work.
- Details of the course may be subject to change.

Class Schedule (Subject to Change as Instructor Sees Fit)

Week 1	Orientation & Overview
Week 2 - 3	Research Lab Placement
Week 3 - 4	Research Supervisor Name & Project Title (or Theme) Due
Week 4 - 14	Conduct Research for Project
Week 8	Online Scientific Module(s)
Week 11	Research Project Discussion
Week 13	Research Project Discussion
Week 14	Finalize Research Project
Week 15	Poster Printing (April 30 @ 12PM Due to chrystie.naeole@chaminade.edu) Symposium (May 2 @ 5:30PM – 6:30PM in Wesselkamper 120)