

Students save this for your reference and give a copy to your mentor

Instructions to Students  
NSCI 2995 and 3995: Undergraduate Research  
Neuroscience Undergrad Research Advisor: Dr. Ryann Guayasamin

Students are responsible for understanding and following requirements, address questions to Dr. Guayasamin.

**Section Description:**

The goal of Advanced Undergraduate Research is to allow students to work closely with experienced researchers on an original research project. Students can enroll for 1-18 credits, each credit requires a minimum of 40 hours. However, many students put in even more time. Students are expected to work progressively at an advanced level because they have already taken Undergraduate Research (NSCI 2995 or NSCI 3995), or have had a few 2000-level Neuroscience courses, at least one with laboratory.

NSCI 2995 and 3995 require a written proposal early on in the semester. Furthermore, for multi semester projects, a mid-project summary is required at the end of the first semester. A final report in the style of a journal article is required at the end of the final semester.

Students who are Neuroscience B.S. or B.A. majors may work with faculty members in any neuroscience-related lab across colleges on campus. You must indicate the college and department the research lab is located in when submitting the request to enroll to Dr. Guayasamin. Neuroscience B.S. majors are allowed to count up to 3 credits of NSCI 2995 or 3995 research as one of their neuroscience electives under the “A or B” category of electives, but your faculty advisor or a program director will need to request this override.

**Section Expectations:**

Enrolling in NSCI 2995 or 3995: Students first identify a laboratory and research mentor. To obtain an override the student or mentor needs to email Dr. Guayasamin the student name, netid, mentor’s name, mentor’s college and department (e.g. College of Arts and Sciences, Biology Department), course number and number of credits. Note: occasionally students enroll after the drop/add period, email Dr. Guayasamin if you have questions about this.

Enrollment Form: Required of all students ideally by the end of the drop/add period or no later than September 20<sup>th</sup>. Available through Brightspace.

Learning goals: List is available on Brightspace to help with building your individual research goals. This can be developed with and approved by the research mentor. You can select 10 of these skills you plan to develop during the project and add them to your proposal. Possible skills include writing and information literacy, lab techniques (e.g. pipetting, PCR), data collection and record keeping, data management on spreadsheets, statistical analysis and writing reports.

Proposal (target date: shortly after the add/drop period). Note: because of the nature of independent research if you need extra time for this please ask. Submitted through Brightspace, and described more fully on the next page. The proposal will be developed with and approved by the mentor and should briefly state the goals of the ongoing research, the role of the student in the project. NSCI 2995 and 3995 proposals are often started over the summer or winter break, before the semester in which the research occurs.

Final Assignment: Students continuing the project and enrolling in research the next semester will prepare a short summary of the semester’s activities and a plan for the upcoming semester. Students not continuing with the project and/or students who will have completed 6 research credits (including this semester) will prepare a paper in standard journal format under the supervision of the research mentor. The length of the paper should reflect the time and credits devoted to the project (e.g., 1-6 credits over 1-2 semesters). The final assignment, after approval by the Research Mentor, should be submitted through Brightspace.

Target dates for semester work/final paper:

Meet with mentor and submit enrollment form to Brightspace

By Friday, September 20<sup>th</sup>

Mentor-student meeting to review project and outline report	October 7-11
Submit proposal to Brightspace	Friday, October 11
Draft of paper to mentor	Friday, November 22
Final paper to mentor and to Dr. Guayasamin (through Brightspace)	Friday, December 6
Grade to Dr. Guayasamin	Friday, December 6

## Proposal

The Proposal should be single-spaced, in a professional format and style. The length of the proposal should mirror the time commitment and complexity of the project.

### Proposal and Final Paper Sections May Include:

1. **Introduction:** Place the project in a general context of the discipline. Begin with a very general statement, then focus in on the specific topic to be explored. What are the implications of your study? Demonstrate that this is a scientific study, asking original questions about an important problem in the life sciences. The QUESTION, HYPOTHESIS, and PREDICTED OUTCOME should be stated in language understandable to a general reader familiar with the life sciences. A reader should know, after reading the Introduction, WHAT you will be doing and WHY you are doing it. Be sure to include name(s) of the Faculty member, Postdoc, Technician and /or Graduate Students working with you.
2. **Methods:** Present the details of the protocol to be followed. Where will you do the work? What equipment and supplies will you be using? What methods are required, and which will you need to learn? What are the analyses to be completed? Note that any use of vertebrate animals or human subjects must be approved by the appropriate institutional review panel (the student's research sponsor will have information on this subject). In addition, students working in labs are required to take the appropriate lab safety courses:  
<http://www.uvm.edu/safety/lab/safetytraining>.
3. **Expected Results:** Present here some ideas of the type of results that you expect from your project. Suppose your results conflict with the hypothesis under scrutiny -- how would you interpret such results?
4. **Relevant Literature:** Provide a bibliography including papers cited in the proposal. Also list 2-3 papers you will read during the semester that will increase your understanding of the lab's program.

## MESSAGE TO UNDERGRADUATE RESEARCH MENTORS

Thank you for agreeing to serve as an undergraduate research mentor! Over the years, students have told us that undergraduate research projects were a central event in their academic experience. Students remember the Research Mentors as their most important role models.

The goal of an Undergraduate Research Project is to work closely with experienced researchers as part of an ongoing, research project. Advisors are always a faculty member but the student may work day-to-day under the supervision of a Postdoctoral Fellow or senior graduate student. Although the student will be incorporated into an ongoing project, for NSCI 2995 or 3995 the student is expected to be working independently by the end of the first semester. We have two research courses, NSCI 2995 where the student is somewhat like an apprentice, shadowing a researcher learning skills or is at an intermediate level of research. It is often taken by students with little experience at the beginning, but students are expected to be working independently by the end of the semester. By the end of the semester, both the NSCI 2995 and 3995 students are expected to write a final summary/paper in the format of a journal article. For research students who have completed 6 credits of research, the student will prepare a 5-8 page research paper on their independent project as the project concludes.

Students may take NSCI 2995 or 3995 for 1-18 credits. Each credit requires a minimum of 40 hours. For example, 3 credits require a minimum of 120 hours, or at least 8 hours per week during a 15-week semester or 10 hours per week during 12 weeks in the summer.

**Evaluation:**

Dr. Guayasamin will submit the final grade based on the evaluation of the Mentor. A recommended timeline is above. The student is responsible for reminding you to submit the grade, but please help the student to complete assignments by the grade deadline.

The guidelines for grades are:

**A** = Completed assigned duties on time, highly dedicate, high quality work. Participated in all lab discussions. Read and thoughtfully discussed assigned publications. Student has a strong understanding of the hypotheses, data collection and analysis of data. The final paper is excellent.

**B** = Completed most assigned duties on time and with good accuracy. Sometimes participated in lab discussions. Read assigned publications and asked solid questions. Final paper is useful to the lab.

**C** = Completed many of the assigned duties, mostly on time. May have had to repeat observations to attain accuracy. Read and generally understood assigned publications. The work is useful to the lab.

**D** = Completed some assigned duties, often with low quality. Failed to complete some readings. The final work has limited interest and not likely to be used in future studies.

**F** = Failed to meet minimum requirements for a passing grade.

**SP/UP** = For students continuing into the next semester. Neither SP nor UP is included in the student's GPA.

The grade of SP indicates satisfactory progress and credit will be awarded. The grade of UP indicates unsatisfactory progress and no credit will be awarded. Both SP and UP can be final grades and remain on the transcript. If desired, they may be changed according to the following: SP may be changed to a letter grade once the final grade for the multiple semester work is completed; SP cannot be changed to UP or F based on completing the final semester's work unsatisfactorily. UP may be changed to an F.