BIOLOGICAL SCIENCES 198 & 199 COURSE SYLLABI

The Rose Laboratory
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Course Descriptions:
These are introductory (Bio Sci 198A-B-C) and advanced (Bio Sci 199) courses in experimental ecology and evolutionary biology designed for biology majors, but open to all students at the school who have met the prerequisites outlined in later sections.

This educational program is intended for students to learn how cutting-edge experimental methods are used for in-depth studies of the mechanisms that drive evolution and ecology including: natural selection, mutation, genetic drift, speciation, life history patterns, age-specific selection, sexual selection, and population dynamics. Students will have the opportunity to work with Drosophila melanogaster as a model organism as they learn essential laboratory skills that complement their higher education curriculum.

Coupled with the educational component will be the opportunity to add research experience to students’ resumes, learn valuable teamwork and leadership skills, and potentially earn a letter of recommendation toward advanced degree programs (graduate or health professional schools). Undergraduates who demonstrate a strong understanding of the culture, methods, and theories in the lab will have a chance to participate in the Excellence in Research Program (publication, poster presentation, and oral presentation) and/or the Undergraduate Research Opportunities Program Symposium (poster and/or oral presentation).

Text:
The optional text to this course is Evolution and Ecology of the Organism, by Rose and Mueller. The material you will be learning throughout this course will reflect topics covered in this book. Copies are on reserve at the Science Library.

Prerequisite Policy:
The prerequisite to Bio Sci 198A-B-C and Bio Sci 199 is a passing grade (P) in Bio Sci 194S. Completion of Bio Sci 94 is recommended, but not required. Students new to the Rose Lab will be required to enroll under Bio Sci 198A-B-C until further promotion to Bio Sci 199 is earned at the discretion of Dr. Rose and the graduate students. Continuation in the lab will be determined by students’ conduct, efficiency, attitude, and reliability during the first quarter as a Bio Sci 198 student. These policies are strictly enforced and no exceptions will be made.

Grading Policy:
Students will be graded based on the quality and quantity of work completed throughout each quarter. Students are also expected to attend all assigned shifts on time. Students are expected to notify their respective experiment leaders (Bio Sci 199) or graduate student(s) at least 48 hours in advanced if they cannot make it to a shift to reschedule makeup hours. Each unexcused absence will result in a half letter grade reduction (i.e. A to A-, B+ to B, etc.). All absences/tardies without 48 hour notice will need to be cleared with your immediate supervising graduate student for it not to affect your grade.

Other Related Courses:
E106: Processes in Ecology and Evolution (Rose)
E115L: Evolution Laboratory (Long, Mueller)
Criteria for promotion to Bio Sci 199:
Students may request to enroll in Bio Sci 199 in the Rose Lab if they meet the following criteria:

- **OBSERVATION:** Student must observe training demonstrations and participate in group tasks such as: egg collections, data collection, sexing flies, etc.

- **COMMUNICATION:** Students must be able to effectively and efficiently communicate with their fellow lab mate(s), graduate student(s), and principal investigator(s).

- **QUALITATIVE ABILITIES:** Student must be able to comprehend, measure, calculate, analyze, and reference information over different channels. They must also be able to formulate and test hypotheses in the laboratory environment.

- **SOCIAL ATRIBUTES:** Students must demonstrate maturity and emotional stability required for efficient conduct in the lab. They must be able to collaborate with peers from the same cohort, adapt to the wide variety of tasks within the lab, and accept constructive criticism from others.

- **EXAMINATION:** Students who request to transition from Bio Sci 198A-B-C to Bio Sci 199 will need to complete a comprehensive, multiple-choice, examination and an oral interview on laboratory protocols and required Bio Sci 198A-B-C fundamental topics (See Page 3: genetics, selection, macro and microevolution).

Students who request to enroll in Bio Sci 199 will be individually evaluated by the graduate students and Dr. Rose if the above criteria are met. Students enrolling in Bio Sci 199 must be able to commit to 20 hours (5 units) to research per week; exceptions may be granted on an individual basis.
The Rose Laboratory’s Six Tier Educational System

Level 1: Biological Sciences 198
Educational Topic(s): Genetics
Research Skills Acquired: Competence of laboratory protocol
Promotion Criteria: Excellent execution of laboratory protocols in a team setting
May Request Letter of Recommendation: No

Level 2: Biological Sciences 198
Educational Topic(s): Selection
Research Skills Acquired: Mastery of laboratory protocol
Promotion Criteria: Discussion of specific team commitment under a graduate student(s)
May Request Letter of Recommendation: No

Level 3: Biological Sciences 198
Educational Topic(s): Molecular & Macroevolution
Research Skills Acquired: Ability to teach laboratory protocol to students and lead basic tasks
Promotion Criteria: Desire to pursue responsibility as experiment leader. OPTIONAL: Participation in Excellence in Research and/or UROP Symposium.
May Request Letter of Recommendation: Yes

Level 4: Biological Sciences 199
Educational Topic(s): Life History, Statistics, Experimental Design
Research Skills Acquired: Ability to lead alongside other leaders as a group
Promotion Criteria: Demonstrate a solid understanding of the laboratory environment. OPTIONAL: Ready to manage a project for EIR and/or UROP.
May Request Letter of Recommendation: Yes

Level 5: Biological Sciences 199
Educational Topic(s): Sex, Social Evolution
Research Skills Acquired: Demonstrate an exceptional ability to individually lead other undergraduates. OPTIONAL: Selection of a desired project for EIR and/or UROP
Promotion Criteria: Student is an expert in experimental methods and theory and is able to promote an efficient and professional work environment
May Request Letter of Recommendation: Yes

Level 6: Biological Sciences 199
Educational Topic(s): Human Evolution, Darwinian Medicine
Research Skills Acquired: Demonstrate the ability to independently manage a research team.
Promotion Criteria: N/A (students are competent at the level of graduate/health professional students)
May Request Letter of Recommendation: Yes

***Although students at higher tiers will function as experimental assay leaders, our level system should not be viewed as a hierarchy, but rather as a sign of theoretical and experimental competency among our undergraduates. Regardless of their level (Levels 1-6), all undergraduates are trained and expected to treat each other with respect and dignity as equals. We at the Rose Lab believe that teamwork is a key component to the scientific setting. Therefore, it is our mission to teach our students the benefits of being a team player and how to learn to adapt to a robust laboratory environment.