# EEB 323 Fall 2015 Evolutionary Genetics

**Instructors**:
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**Teaching Assistants (TAs)**:
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**About the course:**  This course is intended for students with a serious interest in the study of evolutionary biology.  Because of the importance of evolution to all biological disciplines, this course has not been restricted to those students specializing in evolution.  Nonetheless, this course is taught at a high level and is intended to provide a firm and rigorous foundation for those continuing in this subject.

As genes are the substrate of evolutionary change, much of this course will focus on evolutionary genetics, i.e., how and why alleles change in frequency and our ability to detect such changes.  (A follow-up course, EEB 324 Evolutionary Ecology, focuses more on changes in phenotypes as driven through the interaction between phenotype and environment.)  Evolutionary biology, more so than any other biological discipline, is built upon a strong mathematical foundation.  Students will be exposed to this mathematical theory and be expected to learn the basics elements of it.  The theoretical framework allows us to quantify the importance of different evolutionary forces and make predictions that can be examined empirically.  Students will learn how molecular data is used to test patterns predicted by evolutionary theory.

The following topics will be covered (instructor initials in parentheses)

1.  Basics of probability theory (AA)
2.  Drift:  the very basics (AA)
3.  Simple models of mutation, migration, and selection (AA)
4.  Mutation-selection balance (AA)
5.  Speciation (AA)
6.  Evolution of sex (AA)
7.  Sources of genetic variation (AC)
8.  Quantifying genetic variation (AC)
9.  Genealogy and coalescence (AC)
10.  Divergence and phylogeny (AC)
11.  Molecular population genetics (AC)

**Course notes and announcements are available on-line through the EEB323 site on "Blackboard".**

**Course text book:** The *recommended* textbook for the course is, "Principles of Population Genetics" by D. Hartl and A. Clark (2007, Sinauer Associates). Although this text is not required, this book is found on the shelf of any evolutionary geneticist. It provides additional/alternative presentation of many of the topics presented in this course as a useful supplement to the course notes. It also has many practice problems that will help you to confirm your understanding of the material. There is a copy on reserve in the Earth Sciences library. Another relevant *recommended* textbook for this course is, "An Introduction to Population Genetics, Theory and Applications" by R. Nielsen and M. Slatkin (2013, Sinauer Associates).

**Course meeting times (lectures)**
The course meets Tuesdays 11am – 1pm and Thursdays 12pm - 1pm in BA1210. Students are expected to attend all of these classes.  The second hour on Tuesdays (12pm – 1pm) will typically be used to review problem sets.

**Tutorials**
Students must be registered in a tutorial.  Tutorial attendance is mandatory. **Part of your grade will come from weekly quizzes given in tutorial.**  You must attend the tutorial in which you are registered.

**Getting extra help:**  We are fortunate to have some excellent TAs available to provide extra help (see above).  If you need additional help, you should contact the TAs by email to arrange an appointment.  If you are unable to find a mutually agreeable time with any of the TAs, then contact the appropriate instructor.  Do not fall too far behind before seeking help!

**Corresponding by email:**  Email is the easiest way to communicate with TAs and instructors. Your email message **must** include in the subject line the course identifier and a concise and clear statement of purpose [e.g., EEB323: I have a conflict with next test]; otherwise it is likely to be deleted by automatic spam filters.

**Evaluation and Exam Dates\* (% of final grade)**

| | |
|---|---|
| Mid-term 1:  Tues. Oct. 13 | 30% |
| Mid-term 2:  Tues. Nov. 17 | 30% |
| Final exam:  December exam period | 30% |
| Weekly tutorial quizzes | 10% |

\*Note that exam dates are tentative until final exam room availability is confirmed with the university. Finalized exam room/day information will be announced in advance in class and on Blackboard.

All exams will consist of multiple choice and short answer questions.  **No calculators or study aids of any type are permitted**.  You must bring a pencil to each exam (for the multiple choice section). Exams from previous years will be available on the course website as a study aid.

***Students who have a legitimate reason for missing an exam (consult University guidelines for details) should let the instructor know within **24 hours**.  It is the student's responsibility to ensure they have the proper documentation for missed exams and to follow proper procedures.  Students missing an exam will write a make-up exam that may be of a different format than the in-class exam (short-answer, problems, essays).