

## **Ecology and Evolutionary Biology Graduate Courses 2017-2018**

Updated July 31, 2017

**Note:** Section Code: usually F, S or Y. This indicates whether the course is offered in the fall session (F), the winter session, i.e., second term (S) or over both (Y).

**Graduate courses and seminars officially begin in the week of September 11<sup>th</sup> for September session courses (F) and January 8<sup>th</sup> for January session courses (S); however, some of the EEB graduate courses will not begin until the second week of classes and courses at UTM and UTSc maybe begin before the listed dates—please check with the course Instructor.**

**For information about graduate courses offered by other departments/groups that will be of interest to some EEB Graduate students (e.g. EES3000H S Applied Conservation Biology [N. Mandrak] at UTSc, EES3113H S Topics in Population and Community Ecology (at UTSc), and others, and a course on R that will probably be offered this year), please see the EEB Grad Course website after Aug. 7: <http://www.eeb.utoronto.ca/grad/current/courses.htm>**

### ***EEB Graduate Courses Offered in Fall 2017:***

**EEB 1310H F Philosophy & Methods** [H. Rodd (team leader), Njal Rollinson, and guests]

*Day and Time: Thursday afternoons at St.G. campus (2:00-5:00). Location: TBA*

This course will involve a combination of (i) student-lead discussions (some topics are listed below), (ii) lectures/discussions lead by faculty designed to cover general and often controversial scientific issues frequently confronted in both ecological and evolutionary studies, and (iii) short presentations by students introducing the background and context for their proposed research. This course is recommended for students just starting an MSc or PhD, and for students in the second year of their PhD who have begun to nail down a thesis topic. It is intended to be a forum for students to enhance their current skills and understanding of how to do 'good' science and to discuss some issues that they will encounter as scientists. The class will read papers on and discuss topics that will include: human subjectivity and biases, and their role in science; some semi-philosophical controversies about approaches to science and research tactics; some common and important pitfalls/errors in experimental design and statistical analysis (note: a strong background in statistics is not necessary for the course, but at least one undergraduate course in statistics is recommended); brief overviews of some new statistical approaches; and a variety other issues that are important to researchers (e.g. ethics). Faculty from the department and other guests will give brief, overview lectures to provide a bit of background on some of the topics (e.g. power analysis). The major assignment for the course is an essay that aims to facilitate students' progress in thinking broadly about their thesis research, before they write their thesis proposal; to this we ask the students to put their research questions in the context of their general field (ecology or evolution)—both historically and with respect to the exciting questions currently being asked in their discipline.

**\*\*Please see more graduate courses (with significant undergraduate content) offered in the Fall 2017 term listed below\*\***

## ***EEB Graduate Courses Offered in Winter 2018:***

EEB1210H S (1/4 course) **Advanced Statistics** [M.-J. Fortin] 6 week module (tentatively, in the second half of the Winter term)

*Day & Time: TBA*

*Location: TBA*

Biologists need to use statistical methods to test their hypotheses. Given the increasing complexity of experiments carried out by biologists, they need however to understand the limitations of these statistics and how to select the appropriate statistics for their needs and how to interpret them properly both statistically and biologically. The goal of this advanced course in statistics is to teach biologists how to choose and use statistics so that they can address relevant biological questions and test them with the appropriate methods. Specifically, an overview of advanced notions about regression and ANOVA will be presented. To do so, a combination of lectures and computer laboratory sessions will be used.

EEB1315H S (1/4 course) **Professional Skills Development** [M. Sokolowski, H. Rodd and others]

*Day & Time: Alternate Thursday afternoons*

*Location: St. George Campus, TBA*

A short (0.25 FCE) graduate-level course focused on developing the academic and professional skills required to succeed during and beyond graduate education in basic life sciences, with an emphasis on ecology and evolution.

EEB1315 will meet for approx. eight 2-3 hour sessions in alternate weeks (tentatively on Thursdays for 2017). The sessions will run from 3-6 or 4-7 depending on the availability of the guest participants. The class sessions will be comprised of A (see below) in some weeks and A+B in other weeks:

(A) Lecture and/or student led discussion and/or working group activities: 1-3 hours (depending on the schedule for that week). Topics will include converting CVs to resumes, informational interviews, speaking and writing for non-specialists, time and project management.

(B) Guest Panel Discussions: 1.5 hours. There will be 2-3 panel discussions over the duration of the course. Guest panelists will be chosen largely from the department's graduate alumni, and they will speak about their career pathways and the skills that they developed during their graduate education that they find valuable in their careers. They will be selected from a range of careers including government, industry, higher education; suggestions from the class will be welcome.

**\*Tentative:** EEB1230H S **Multivariate Statistics** [D. Jackson]

Note: this course is only open to PhD students in Year 2+; enrolment is by permission of the instructor

EEB 1360H S **Special Topics in Behaviour: Integrative Biology of Behaviour** with a focus on behaviour genetics, genomics and neurobiology [Mark Fitzpatrick (EEB), Tod Thiele (CSB, Neuroscience), and Blake Richards (CSB, Neuroscience), with guest lectures by Nick Mandrak (EEB) and Patrick McGowan (CSB) and perhaps TBA]

*Day & Time: TBA*

*Location: UTSC*

EEB 1450H S **Special Topics in Ecology and Evolution: Landscape Genetics** [H. Wagner and M.-J. Fortin]

*Day & Time: Wednesday 11:30 - 1:30, Jan 17 – May 9, with weekly readings, online lectures and local discussions*

This graduate course on Landscape Genetics provides a unique opportunity for interdisciplinary training and international collaboration and will cater to students (and postdocs) coming from evolution, especially population genetics, and to those coming from ecology, especially landscape ecology and conservation. The course is the local implementation of a Distributed Graduate Seminar on Landscape Genetics that will be held concurrently at several universities in North America and Europe and is provided to individual online participants from across the

globe through University of Idaho. It is possible to join the local group online (e.g. from other campuses). Credit options include either computer lab reports (using R) or participation in an online collaborative group project.

## **Graduate Courses with Significant Undergraduate Content:**

(These courses will normally constitute only a minor component of the required credits for a graduate degree)

### **Fall courses:**

**EEB 1420H F Special topics in Ecology--Models in Ecology and Conservation** [P. Molnar at UTSc, lectures will be available by videoconferencing]

*Day & Time: Tuesdays 12:00-14:00 in BV 355; Tutorials on Thursdays from 13:00-15:00 in BV 471. Graduate students will be registered for the course with permission of the Instructor*

Modelling is a critical tool used to address urgent resource management questions in ecology, epidemiology and conservation. This practical introduction includes approaches for modelling individuals, populations, species interactions, and communities. Applications include population viability assessments, disease eradication and climate change mitigation. Discussion-based tutorials will supplement lectures to provide hands-on modelling experience on a variety of ecological, epidemiological, and conservation questions.

**EEB 1421H F Special Topics in Ecology: Plant-animal Interactions** [M. Frederickson]

*Day & Time: Tuesdays & Thursdays, 1:00-2:00; Fridays 1:00-3:00 Location: St. George Campus, Tuesdays & Thursdays SS1088, Friday RW 142*

Major concepts in ecology and evolution from the perspective of plant-animal interactions. The richness of interactions between plants and animals is explored including antagonistic interactions (herbivory), mutualistic interactions (pollination, seed dispersal, ant-plant associations), and interactions involving multiple species across trophic levels.

**EEB 1460H F Molecular Evolution** [D. Irwin & TBA] (up to 5 grads)

*Day & Time: Wednesdays and Fridays: 10 am – 11 am; Location: St. George Campus, TBA*

Processes of evolution at the molecular level, and the analysis of molecular data. Gene structure, neutrality, nucleotide sequence evolution, sequence evolution, sequence alignment, phylogeny construction, gene families, transposition.

### **Winter courses:**

**EEB 1440H S Special topics in Evolution: Genomics** [R. Ness] at UTM. Funding for the UTM shuttle bus may be available.

The ongoing revolution in DNA sequencing allows biologists to observe the variety of genetic and genomic structures that underpin the diversity of life. The lectures will focus on the diversity of genomic structures, their functions and evolutionary origins. The course is focused on computer-based practicals that provide hands-on training with cutting-edge bioinformatic tools for analysis of genome-scale datasets and next generation sequencing data. Students will learn basic competency in command line environments (BASH) and will further develop skills in Python. Python is required for this course; for those with no Python experience, but a desire to learn, please contact Rob Ness about completing the practicals (this will probably take 4-5 days, working intensively) for his BIO362 (Bioinformatics) course before enrolling in this course.

**EEB 1443H S Phylogenetic Principles** [S. Stefanovic] (up to 5 grads)  
(2 hours, twice a week at UTM) Funding for the UTM shuttle bus may be available.

Lectures will provide an in-depth coverage of modern methods of phylogenetic reconstruction including molecular systematics based on DNA sequences. The principles and philosophy of classification will be taught with an emphasis on 'tree-thinking', one of the most important conceptual advances in evolutionary biology. Tutorials will focus on recent developments in the study of evolutionary patterns while gaining proficiency in reading, presenting, and critiquing scientific papers.

\*Shuttle Bus (Hart House to/from UTM) stop is right in front of this building (IB).

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