



**UNIVERSITY OF
CALGARY**

DEPARTMENT OF BIOLOGICAL SCIENCES
COURSE OUTLINE

1. Course: ECOLOGY 529 - MOLECULAR ECOLOGY AND EVOLUTION

Lecture Section(s): L01 MWF 10:00-10:50 ENF334 FALL 2014

Instructor(s): Dr. S.M. ROGERS BI 379D 210-8573 srogers@ucalgary.ca

Desire 2 Learn (D2L) ECOL529 Molecular Ecology

Biological Sciences Department BI 186 403-220-3140 biosci@ucalgary.ca

2. Prerequisites: Biology 311 and 313
See section 3.5.C in the Faculty of Science section of the online calendar
www.ucalgary.ca/pubs/calendar/current/sc-3-5.html

3. Grading: The University policy on grading and related matters is described sections [F.1](#) and [F.2](#) of the online University Calendar. In determining the overall grade in the course the following weights will be used:

| | | |
|--------------------------|-------------|--------------------------------|
| Midterm Exam I | 20 % | Oct 6, 2014 (in class) |
| Midterm Exam II | 20 % | Nov 12, 2014 (in class) |
| Tutorial Projects | 30 % | |
| Final Exam | 30 % | |

Each piece of work (assignment, laboratory report, midterm test or final examination) submitted by the student will be assigned a percentage score. The student's average percentage score for the various components listed above will be combined with the indicated weights to produce an overall percentage for the course, which will be used to determine the course letter grade.

| Letter Grade | Course Percentage |
|---------------------|--|
| A+ | Reserved for outstanding distinguished performance |
| A | 85 |
| A- | 80 |
| B+ | 77 |
| B | 74 |
| B- | 71 |
| C+ | 68 |
| C | 65 |
| C- | 60 |
| D+ | 55 |
| D | 50 |
| F | <50 |

4. Missed Components of Term Work: The regulations of the Faculty of Science pertaining to this matter are found in the Faculty of Science area of the Calendar in [Section 3.6](#). It is the student's responsibility to familiarize himself/herself with these regulations. See also [Section E.6](#) of the University Calendar

5. Course Materials (Recommended Text): **Molecular Ecology, 2nd Edition**, by Joanna R. Freeland Stephen D. Petersen, Heather Kirk (Co-Editor), April 2011, Paperback, Wiley-Blackwell

In addition, links to journal articles as additional reading will be posted and available on the course website. Students will be responsible for downloading these and understanding the content. The content of these articles may appear on the course examinations.

6. **Examination Policy:** Programmable calculators can be used. Wireless access devices, such as cell phones, PDAs (iPhones, Palm OS or Pocket PC devices, etc.) cannot be used during examinations. Students should also read the Calendar, Section G, on Examinations.
7. **Writing across the curriculum statement:** The quality of the student's writing in reports and exams will be a factor in the evaluation of those reports and exams. See also [Section E.2](#) of the University Calendar.
8. **Human studies statement:** Students will be actively conducting research as part of in-class tutorial exercises and homework associated with the Barcode of Life Project. See also [Section E.5](#) of the University Calendar.

ETHICS IN THE BIOLOGICAL SCIENCES

Studies in the Biological Sciences involve the use of living and dead organisms. Students taking laboratory- and field-based courses in these disciplines can expect involvement with and experimentation on such materials. Students perform dissections on dead or preserved organisms in some courses. In particular courses, students experiment on living organisms, their tissues, cells, or molecules. Sometimes field work requires students to collect a variety of living materials by many methods, including humane trapping.

All work on humans and other animals conforms to the Helsinki Declaration and to the regulations of the Canadian Council on Animal Care. The Department strives for the highest ethical standards consistent with stewardship of the environment for organisms whose use is not governed by statutory authority. Individuals contemplating taking courses or majoring in one of the fields of study offered by the Department of Biological Sciences should ensure that they have fully considered these issues before enrolling. Students are advised to discuss any concern they might have with the Undergraduate Program Director of the Department.

9. OTHER IMPORTANT INFORMATION FOR STUDENTS:

- (a) **Academic Misconduct:** (cheating, plagiarism, or any other form) is a very serious offence that will be dealt with rigorously in all cases. A single offence may lead to disciplinary probation or suspension or expulsion. The Faculty of Science follows a zero tolerance policy regarding dishonesty. Please read the sections of the University Calendar under [Section K](#). Student Misconduct to inform yourself of definitions, processes and penalties
- (b) **Assembly Points:** In case of emergency during class time, be sure to FAMILIARIZE YOURSELF with the information on [assembly points](#).
- (c) **Academic Accommodation Policy:** Students with documentable disabilities are referred to the following links: [Calendar entry on students with disabilities](#) and [Student Accessibility Services](#).
- (d) **Safewalk:** Campus Security will escort individuals day or night (<http://www.ucalgary.ca/security/safewalk/>). Call 220-5333 for assistance. Use any campus phone, emergency phone or the yellow phones located at most parking lot pay booths.
- (e) **Freedom of Information and Privacy:** This course is conducted in accordance with the Freedom of Information and Protection of Privacy Act (FOIPP). As one consequence, students should identify themselves on all written work by placing their name on the front page and their ID number on each subsequent page. For more information see also
- (f) <http://www.ucalgary.ca/secretariat/privacy>.
- (g) **Student Union Information:** [VP Academic](#) Phone: 220-3911 Email: suvpaca@ucalgary.ca.
SU Faculty Rep. Phone: 220-3913 Email: sciencerep@su.ucalgary.ca; [Student Ombudsman](#)
- (h) **Internet and Electronic Device Information:** You can assume that in all classes that you attend, your cell phone should be turned off unless instructed otherwise. Also, communication with other individuals, via laptop computers, Blackberries or other devices connectable to the Internet is not allowed in class time unless specifically permitted by the instructor. If you violate this policy you may be asked to leave the classroom. Repeated abuse may result in a charge of misconduct.
- (i) At the University of Calgary, feedback provided by students through the Universal Student Ratings of Instruction (USRI) survey provides valuable information to help with evaluating instruction, enhancing learning and teaching, and selecting courses (www.ucalgary.ca/usri). Your responses make a difference - please participate in USRI Surveys.

ECOL 529 Molecular Ecology – TENTATIVE LECTURE SCHEDULE

| Lectures | Theme | Suggested Reading |
|----------|---|-------------------|
| 1-2 | 1. Introduction: What is Molecular Ecology | Chapter 1 |
| 3-8 | 2. Concepts and methods of characterizing genetic diversity In-class exercise #1: Intro to Bioinformatics In-class exercise #2: Working with DNA fingerprints | Chapter 2 |
| 9-11 | 3. Molecular Ecology in Single Populations | Chapter 3 |
| 12-14 | 4. Molecular Ecology in Multiple Populations In-class exercise #3: Genepop | Chapter 4 |
| 15-20 | 5. Population Assignment and Mating Systems In-class exercise #4: Structure In-class exercise #5: Parentage Analysis | Chapter 4 (and 7) |
| 21-23 | 6. Studying Ecologically Important Traits: Ecogenomics, QTL Analysis, and Reverse Genetics | Chapter 5 |
| 24-25 | 7. Phylogeography | Chapter 6 |
| 26-28 | 8. Quantifying Natural Selection in Molecular Ecology | Readings Provided |
| 29-31 | 9. DNA Barcoding and the Barcode of Life In-class exercise: Barcoding Fish | Chapter 8 |
| 32-34 | 10. Conservation Genetics in Molecular Ecology | Chapter 8 |
| 35-36 | Synthesis and Course Review | |

Guest Lectures/Facilitators:

Dr. Mason Kulbaba: Bioinformatics and SNPs

Matthew Morris (PhD candidate, Rogers Lab): DNA Barcoding

Brandon Allen (MSc Candidate, Rogers Lab): Population Assignment in Species Conservation