

ECOL 419/519 Introduction to Modeling in Biology

Fall 2017

Instructors:

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Office Hours by appointment

Class room and meeting times

The class will take place MWF 1-1:50 pm in Biological Sciences West 212.

Course description

'Modeling' plays a critical role in biology and the scientific process generally. This course will explore what that role is, focusing on questions in ecology and evolutionary biology. We will introduce different modeling approaches in terms of techniques used, but also in terms of the type of insights that they produce. No advanced mathematical or computer skills are required (during the class, if you feel you struggle with mathematical content, please alert the instructors: we will provide help).

Expected learning outcomes

The primary goal of this class is to enable students to read theory papers (or papers containing some modeling) effectively and critically, including when the paper is challenging and includes unfamiliar mathematical techniques. Reading a paper effectively includes in particular understanding what the paper contributed to science, and whether this was convincingly achieved. Students will also learn basics of writing scripts and programming through in-class and homework exercises. This will allow hands-on experience in what modeling can be used for and what is involved. We also aim for students to gain enough familiarity with scripts and programming languages to make further learning progress on their own.

Workload for the course

There are no midterm or final exams. The main workload, other than during class periods, will stem from the required readings – students will realize that to adequately read a scientific paper containing theory/modeling, several hours may be required. There will also be some homework exercises, largely consisting of short scripts in *Mathematica*. See below for detailed grading information. All required readings will be made available on D2L.

Homework exercises

We will have some homework exercises which will help you get comfortable with *Mathematica* and practical issues in implementing models. You will submit your *Mathematica* notebook file to a Dropbox on D2L.

You will need access to Mathematica to complete the homework. For most people, this means buying a student license for Mathematica online from www.wolfram.com. The desktop version is \$140 for students, however you can also rent for \$45/semester or \$70/year (check the website for pricing and conditions).

Quizzes

We will have a series of 'mini-quizzes' in class, usually consisting of only one or a few questions about the required reading or lecture material.

Grading

Final grade will be determined from your participation in class (10%), the homework exercises (40%), and quizzes in class (50%). Class participation requires not only presence in class but also active participation in discussions and activities.

A: 90-100%; B: 80-89%; C: 70-79%; D: 60-69%; E (fail): 0-59 %

Undergraduate vs. Graduate student requirements

Undergraduate and graduate students will both be completing the same homeworks and other assignments. However, undergraduate students will be able to drop either one of the homework grades or one of the quiz grades from their overall grade calculation (i.e. their worst homework/quiz grade will not be counted towards the final grade).

Readings & Course website

You will be able to obtain readings, homework assignments, and lecture notes via the current class schedule at the course website on D2L. Before the semester starts, or if you are not yet enrolled, you will find general information at: <http://socialinsectlab.arizona.edu/ecol519>

General issues

Professional Communication

If you send any emails to the instructor, make sure to mention the name of the class (ECOL519) in the subject line. Also, start your email by addressing the recipient, and end it with a greeting; always end the email with your full name. Yes, that's also good form for replies in email chains. Re-read your email to check for spelling and grammar errors. Not adhering to these rules will mean that the addressee will get the impression that you are unused to professional communication, and this will probably result in them focusing on your communication style instead of your actual message; this is very detrimental in emails to future employers or mentors, so you should start practicing good habits now. Never assume an email will be answered in less than 3 days.

Classroom Behavior Policy

To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities (e.g., texting, chatting, reading a newspaper, making phone calls, web surfing, etc.).

For this class, use of a laptop to complete exercises is highly recommended. However, we expect the laptop to be used almost exclusively for the current class-relevant task. No electronic communication devices should be used during the class session.

Absence Policies

Each student is expected to attend every class session; enrollment in the course also signifies that a student will participate to the best of his or her abilities in each class session.

If you are absent for any other reason, this will have negative effects on your grade: in particular, you will likely miss the class quizzes and you won't be able to participate, lowering your grade for participation. In addition, you will miss the instruction provided in class as well as your opportunity to actively engage with the material. If you are sick, send the instructor an email immediately (before you miss class).

Requests for incomplete (I) or withdrawal (W) must be made in accordance with University policies, which are available at <http://catalog.arizona.edu/policy/grades-and-grading-system#incomplete> and <http://catalog.arizona.edu/policy/grades-and-grading-system#Withdrawal> respectively.

UA Nondiscrimination and Anti-harassment Policy

The University is committed to creating and maintaining an environment free of discrimination; see <http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy>

Our classroom is a place where everyone is encouraged to express well-formed opinions and their reasons for those opinions. We also want to create a tolerant and open environment where such opinions can be expressed without resorting to bullying or discrimination of others.

Accessibility and Accommodations

Our goal in this classroom is that learning experiences be as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, please let me know immediately so that we can discuss options. You are also welcome to contact the Disability Resource Center (520-621-3268) to establish reasonable accommodations. For additional information on the Disability Resource Center and reasonable accommodations, please visit <http://drc.arizona.edu>. Please plan to meet with me by appointment or during office hours to discuss accommodations and how my course requirements and activities may impact your ability to fully participate.

Please be aware that the accessible table and chairs in this room should remain available for students who find that standard classroom seating is not usable.

Code of Academic Integrity

Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. Students are also encouraged to give concrete tips for solving programming or scripting problems. The use of the internet or published works to help you solve problems in the assignments is also encouraged. Otherwise, graded work/exercises must be the product of independent effort. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog.

See <http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity>.

The University Libraries have some excellent tips for avoiding plagiarism, available at <http://www.library.arizona.edu/help/tutorials/plagiarism/index.html>.

Selling class notes and/or other course materials to other students or to a third party for resale is not permitted without the instructor's express written consent. Violations to this and other course rules are subject to the Code of Academic Integrity and may result in course sanctions. Additionally, students who use D2L or UA e-mail to sell or buy these copyrighted materials are subject to Code of Conduct Violations for misuse of student e-mail addresses. This conduct may also constitute copyright infringement.

Threatening Behavior Policy

The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to oneself. See

<http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students>.

Additional Resources for Students

UA Academic policies and procedures are available at <http://catalog.arizona.edu/policies>.

Student Assistance and Advocacy information is available at <http://deanofstudents.arizona.edu/student-assistance/students/student-assistance>.

Confidentiality of Student Records

<http://www.registrar.arizona.edu/ferpa/default.htm>

Subject to change

Please note that the information contained in the course syllabus, other than the grade and absence policies, may be subject to change with advance notice, as deemed appropriate by the instructor. This is particularly true of the details in the course schedule. The most up-to-date version of the class schedule (including assignment due dates) can always be found on D2L.