

Department of Biological Sciences, Binghamton University
Biol 480V/680V: Coevolution
Fall 2016 Syllabus

Tuesdays 11:40 -1:40 in Student Wing 330

Instructor Information

Instructor: Dr. Tom Powell

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Office: Science III 112

Office phone: 777-4439

Office Hours: Wednesday 10:00 - 12:00 or by appointment

Communication policy- My preferred methods of communication with students are email and in-person conversation. You are welcome to call my office phone too, but please be aware that I don't have a great track record of remembering to check for new voicemails. I will endeavor to respond to emails promptly. If responding to your inquiry requires some thought on my end, I will send you a quick email acknowledging that I received your message and when to expect a proper response. I think that reciprocal dialogue is almost always the best way to resolve issues, so I strongly encourage students to utilize my office hours or make appointments to meet in person.

Course information

Course description- The idea that biotic interactions are major drivers of adaptation is as old as evolutionary biology itself. In the final paragraph of *On the Origin of Species*, Darwin asks us to “contemplate a tangled bank” as a metaphor for the interconnectedness among species in ecological communities. The study of coevolution is essentially Darwin's suggested contemplation writ large. In this class, we will explore and discuss reciprocal evolutionary change around species interactions. The coevolutionary process represents a crucial link between evolutionary biology and community ecology. We will use the reciprocal feedback between evolutionary and ecological processes as a central framework throughout the course. We will address topics in coevolution through the discussion of selected readings (including reviews, empirical studies in natural populations, laboratory experiments, and theoretical papers), some brief lectures on core concepts and examples, and student led projects, presentations, and discussions.

Learning objectives – I view this class as having two sets of goals: proximate objectives related directly to the topic at hand –coevolution- that we will work to achieve during the course of the semester and ultimate objectives that are broader science education goals that I hope to use the course content to work towards throughout the class.

Proximate objectives –

1. Articulate the feedback between ecological and evolutionary processes at work in different types of species interactions

2. Analyze the extrinsic and intrinsic conditions that may promote or constrain the coevolutionary process for a given biological scenario
3. Apply a coevolutionary framework to analyzing problems at the interface of the natural world and human society
4. Develop and effectively communicate strategies for conducting research on the evolution of species interactions.

Ultimate objectives –

1. Become more comfortable navigating the primary literature in ecology and evolutionary biology (or at least become less daunted by highly quantitative papers)
2. Start to think about how scientists develop research programs
3. Develop an appreciation for how ecology and evolution are intertwined with each other and more importantly, how they are both indispensably linked to our understanding of the rest of biology
4. Develop written communication skills – particularly in the concise and concrete language needed in the sciences

Grading

Grades for the course will be assigned based on the following table:

Main category		Sub category	
Participation	40%	Discussion	25%
		Submitted questions	15%
Short paper	15%		15%
Project	45%	Draft	5%
		Presentation	15%
		Peer feedback	5%
		Final written project	20%

Participation – This part of your grade is composed of two components:

The first is simply active participation in class discussions. I expect that as graduate students and upper division undergraduate students, that you will be intellectually engaged with the course material and that you will make substantial contributions to discussions. This is, after all, a seminar. Please note that *I will not penalize this portion of your grade without meeting with you about it first.* So, if I don't think you are participating enough, I will let you know (privately) first and give you a chance to correct it.

The second part is comprised of discussion questions submitted before each class. For each assigned reading, I would like you to submit a potential discussion question to me, via email, no later than one hour before class time (10:40 am). I want these questions to be the sort to provoke a conversation, rather than a straight forward answer.

Short paper – This assignment will be given about mid-way through the semester (see schedule below). Details of the topics and expectations for grading will be given then.

Project – The project for this course will be a brief, hypothetical research proposal outlining an approach for studying any species interaction from an evolutionary perspective. I intend to “scaffold” this project (help you build up the final version rather than just expect a completed, polished project turned in at the end) by being involved in many of the early stages, including choosing topics and a first draft turned in for a grade. After turning in the draft of the project, you will also be required to give a short (12-14 minute) presentation on your proposal in class to your peers. During the presentation, students will be required to fill out feedback forms for each of their peer’s proposal presentations. You will then use that feedback in revising the final version of the proposal. Specific grading guidelines will be provided when this is officially assigned (see schedule below).

Course Policies

Official BU policy of credit hours and work expectations- This course is a 2-credit course, which means that students are expected to do at least 6 - 6.5 hours of course-related work or activity each week during the semester. This includes scheduled class lecture/discussion meeting times as well as time spent completing assigned readings, studying for test and examinations, participating in lab sessions, preparing written assignments, and other course -related tasks.

Disability-related Equal Access Accommodations – Students needing accommodations to ensure their equitable access and participation in this course should notify the instructor with an Academic Accommodation Authorization from Binghamton University's Services for Students with Disabilities (SSD) office as soon as they're aware of their need for such arrangements. Please visit the SSD website (www.binghamton.edu/ssd) for more detailed information. The office is located in University Union, 119.

Academic Dishonesty- I fully expect each of you to abide by the University’s *Student Academic Honesty Code* (follow link on <https://www.binghamton.edu/harpur/faculty/acad-honesty.html>) in all of your work connected with this course. Please note that I reserve the right to use plagiarism detection software on any material you turn in. Any infractions will be reported to the Harpur College Academic Honesty Committee and will result in a grade of zero for the assignment.

Dealing with stress and difficulties this semester – One of the things that has impressed me about BU in my short time here is the university’s explicit efforts to provide support for its students. College or grad school can be very stressful. If during this semester, you find your self undue personal or academic stress – please reach out for support. The people at this university, myself included, really want you to succeed and care about your well-being. Please don’t hesitate to talk to me about any issues that may affect your work in my class. Additionally, I am more than happy to help you in reaching out to any one of a wide variety of campus resources.

Tentative course schedule- readings for the following week's class will be emailed to students after class on Thursdays. I can also post them on blackboard if some students prefer that. The list below is definitely subject to change – but those changes will be made at least a week in advance and you will be informed both in class and via email.

8/30 – Introduction to topic – review of species interactions

9/6 – Coevolution as the link between ecology and evolution

Readings: Slatkin 1984; Abrams 2000

9/13 – The geographic mosaic framework

Readings: Hanifin et al. 2009; Benkman et al. 2003

9/20 – Experimental approaches to studying coevolution

Readings: Yoshida et al. 2003; Forde et al. 2004

9/27- Mutualisms

Readings: Parker 1999; Frederickson & Gordon 2007

9/28 – Parasitism

Readings: Lively & Dybdhal 2000; Sachs and Sims 2006; Vale et al. 2011

10/4 - NO CLASS

10/11- Endosymbiosis

Readings: Jeon 1972; Douglas 2014; Hill 2015

10/18 – Coevolution and speciation *a bit out of order due to seminar speaker Andrew Forbes on 10/21 – attending this seminar isn't mandatory but it's strongly encouraged

Readings Feder & Forbes 2010; Condon et al. 2014

10/25 – Disease coevolution

Assign short papers

Readings: Mideo et al. 2008; White et al. 2011

11/1 – Host manipulations

****Schedule meeting times about project topics****

Readings: Poulin 2013; Costa da Silva & Langoni 2009; Flegr 2007

11/8 – arms races with humans

*****Short papers due before class*****

Readings: Tabashnik et al. 2013; Palmer & Kishnoy 2013

11/15- Class discussion on papers topic I

11/22- Class discussion on paper topic II

11/29 – Macroevolutionary trends

*****Draft of project due before class*****

Readings: Farrell 1998; Farrell et al. 2001; McKenna et al. 2009

12/6- *****Project presentations*****

12/15 – *****Final projects due via email*****