COURSE SYLLABUS

BIOL 271, Ecology & Evolution
Spring Semester 2017

Instructors:	Bob Paul	Jordan Price
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Phone:	x 4211	x 2216
Office hours:	Tues & Thurs, 10:00 am-noon	Tues & Thurs, 11:00 am-1:00 pm
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Lecture:	Section 01	Monday, Wednesday, Friday 09:20-10:30 am, SH 109	
	Section 02	Monday, Wednesday, Friday 10:40-11:50 am, SH 109	
Laboratories:	Section 01	Mondays	1:20-4:10 pm, SH 112, J. Price
	Section 02	Tuesdays	1:00-3:50 pm, SH 112, K. Lewis
	Section 03	Wednesdays	1:20-4:10 pm, SH 112, J. Price
	Section 04	Thursdays	1:00-3:50 pm in SH 112, K. Lewis

Course description:

This course examines ecological and evolutionary concepts and mechanisms and incorporates these in a discussion of organismal relationships across a range of timescales and levels of organization. Scientific writing and statistics are also emphasized. Lectures will be team-taught by the instructors. Ecology and Evolution lecture and lab (BIOL 271 and 271L) are core requirements of the Biology Major, have a prerequisite of Genetics (BIOL 270 and 270L), and satisfy the biology requirement for the Environmental Studies Major.

Course goals:

At the completion of BIOL 271 and 271L, you will be able to:

- generalize ecological and evolutionary concepts to relevant modern issues, including climate change, conservation biology and other biological issues that are of concern to *you*;
- use your understanding of ecological and evolutionary principles to solve higher order problems;
- recreate models of ecological and evolutionary processes in lecture assignments;
- perform statistical analyses using appropriate tests to analyze collected data;
- use the scientific method to design and execute your own scientific experiment;
- complete a final comprehensive laboratory report using skills developed during the semester.

Required Materials: Cain, M. L., W. D. Bowman and S. D. Hacker. 2011. Ecology, 2nd edition. Sinauer Associates, Inc., Sunderland, Massachusetts, USA.

Futuyma, D. J. 2009. Evolution, 2nd edition. Sinauer Associates, Inc., Sunderland, Massachusetts, USA.

Department of Biology. 2016. Ecology and evolution laboratory manual. St. Mary's College of Maryland, St. Mary's City, Maryland, USA.

Classroom remote-response unit (clicker). Available for purchase at the Campus Store. If you already have one from a previous class, you may use that one.

Suggested Text: McMillan, V.E. 2012. Writing papers in the biological sciences, 5th edition. Bedford/St. Martin's, Boston, Massachusetts, USA.

Additional readings will be assigned as needed and posted on the course Blackboard site.

Office hours and student meetings:

Our office hours are maintained specifically for meetings with students, but we will try to meet with you whenever we are free. At times, you may have to make a specific appointment to see us, but we encourage all students to come by and talk (for help in the course, career advice, *etc*.). Our daily schedules are posted on our office doors.

Class meetings, lecture and requirements:

BIOL 271 meets in Schaefer 109. Lecture is the primary instructional mode, but some class discussion will also be included in the course. We expect students to attend all lectures and to be on time. Students are responsible for all the material presented during the class meetings, including information in guest lectures, videos, *etc*. If you know in advance that you will be absent from class, we would appreciate if you would let us know. We will also make liberal use of the campus computer resources, including Blackboard (Bb), and assume that students enrolled in the course are familiar with these resources and will check their campus email on a daily basis.

Clickers

We will be using classroom-response devices (i.e., clickers) in a way that will be familiar to you if you took Principles of Biology at St. Mary's recently. During most lectures, your instructor will ask questions, and you will be expected to provide an answer via your remote "clicker." Points for answering these questions will be determined by your participation, not the correctness of your answers. We will calculate your clicker points as a percentage of 100 total points for the semester, but will "gift" you 10% to account for absences, forgetting to bring your clicker to class, dead batteries, user error, etc.

Evaluation:

There will be two in-class lecture exams, four lecture assignments, and laboratory material for evaluation. The final examination will be comprehensive. Make-up examinations are permitted only in the case of severe illness or other very serious difficulties; generally they will consist of oral examinations given on the last day of final examinations. All assignments must be handed in at the beginning of class on the due date. The standard Biology Department penalty of **10% per day** will be assessed for late work.

Lecture Exams (2 at 100 pts each)	200
Comprehensive Final Exam	200
Lecture Assignments (4 at 25 pts each)	100
Clicker responses	100
Total points for lecture	600

Laboratory (400 points total)	
Final Report	100
Drafts of report	20
Proposal Presentation	25
Final Presentation	25
Laboratory Performance	30
Lab Practical Exam	50
Quizzes and other Lab Assignments	150
Total points for lab	400

LECTURE SCHEDULE:

Week	Dates	Topic	Readings
1	Jan 18-20 (No class Monday)	Introduction to course Introduction to evolutionary concepts	Futuyma Chapter 1; Cain et al. Chapter 1
2	Jan 23-27	Leaf decomposition in streams Climate. Biomes	Vannote et al. (1980) (on Bb) Cain et al. Chapters 2, 3 and 4
3	Jan 30-Feb 3	Coping with environmental variation. Phylogenetics and the tree of life Molecular evolution	Cain et al. Chapter 4 Futuyma Chapters 2 and 3 (pg 45-58)
4	Feb 6-10	Population genetics, Heritability, Genetic drift, Inbreeding, Gene flow.	Futuyma Ch. 9 and 10 (pg 255-269)
5	Feb 13-17	Genetics of natural selection **First Exam (Friday, Feb 17)**	Futuyma Ch. 11 and 12 (pg 303-325); Caine et al. Ch 6
6	Feb 20-24	Population distribution and abundance, Population growth and dynamics	Cain et al. Chapters 8, 9 and 10
7	Feb 27-Mar 3	Sexual selection, Inclusive fitness	Futuyma Ch. 15 (pg 397-409); Futuyma Ch. 16 (pg 417-430)
8	Mar 6-10	Competition Predation and herbivory	Cain et al. Chapters 11 and 12
9	Mar 13-17	**Spring Break**	
10	Mar 20-24	Parasitism. Mutualism	Cain et al. Chapters 13 and 14
11	Mar 27-31	Species and speciation **Second Exam (Friday, March 31)**	Futuyma Chapter 17
12	Apr 3-7	Community structure and succession	Cain et al. Chapters 15 and 16
13	Apr 10-14	Biogeography and disturbance	Cain et al. Chapters 17 and 18; Futuyma Chapter 6
14	Apr 17-21	Ecosystem function	Cain et al. Chapter 19, 20 and 21
15	Apr 24-28	Applied ecology and other topics	TBA
	May 6 & 8	**Final Exams (Sect 1 on May 6, 9-11:15 AM; Sect 2 on May 8, 2:00-4:15 PM)**	

Special readings and other course materials will be posted on Blackboard.

Lecture Assignments due dates:

1. Phylogenetics - **Wednesday, 2/8**
2. Hardy-Weinberg - **Monday, 2/13**
3. Population Dynamics - **Friday, 3/3**
4. Community Diversity - **Friday, 4/14**

ECOLOGY AND EVOLUTON LABORATORY

Overview of Laboratory:

The laboratory in Ecology and Evolution has several distinct objectives. Most importantly, the lab complements lecture by reinforcing concepts and demonstrating how biologists investigate ecology and evolution. Second, the laboratory allows students to apply the scientific method to ecological and evolutionary problems. Finally, the lab allows students to strengthen their analytical and communication skills by using basic statistics and by writing laboratory reports. You will conduct a long-term independent small-group project, and this project will be the basis for an extended laboratory report. We have recommended the McMillan (2012) text on the first page of the syllabus because we think it will help you with your writing. You may find it useful in other biology courses, too, and in your SMP. The required *Ecology and Evolution Laboratory Manual* (Department of Biology 2015) provides detailed instructions for all the scheduled laboratory exercises. Of course, you will also maintain your own laboratory notebook. We recommend a small, field-portable notebook, rather than the more conventional chemistry-style laboratory notebook, because we will be doing a number of activities where you will want to take notes in the field, perhaps in inclement weather. However, any kind of laboratory notebook with permanently bound pages will do.

Laboratory Meetings:

Most of the laboratory meetings will require the entire laboratory period, and there will be some laboratory exercises that will require you to come to the lab outside of the regularly scheduled lab period to check on experiments or to do additional work. These times will be flexible and probably will not necessitate coming to the lab at night. Laboratory attendance is required; it is usually not possible to make up a laboratory, and thus there is no provision for this in the course's grading policies. If you know in advance that you must miss a laboratory meeting, it may be possible for you to attend one of the other lab sections; see your lab instructor. Because the laboratory is largely field-oriented, we will be outside for many of our laboratory sessions. You will need to dress appropriately and responsibly for the prevailing weather conditions, especially at the beginning of the course (it is best to anticipate the worst!). You can assist us with laboratory by 1) being on time, 2) helping with the loading of equipment and supplies to and from the field, and 3) cleaning up the laboratory at the end of each lab. We will appreciate your help.

Lab Evaluation:

A large portion of your final lab grade, 100 points out of 400 total, will be based on an independent-project report. Periodically during the semester, students will hand in drafts of the sections of this report (Introduction, Methods, Results, and Discussion), and these drafts together will account for 20 total points. Team-mates may collaborate to write their Methods and Results drafts, but each student will write their Introductions and Discussions individually. **Also, all students will be asked to turn in these drafts with instructor comments along with their final revised report.** Because most of the laboratory projects require careful gathering and recording of data so the entire course can share the results, we will assign another 30 points for timely and accurate completion of laboratory tasks. A final laboratory practical examination (50 points) that tests mastery of techniques and knowledge of procedures will be given on the last lab meeting of the semester (15^{th} week). Presentations, quizzes, and several other laboratory assignments will account for the final 200 points. These assignments will be based on the various laboratory exercises and will be described in lab.

LABORATORY SCHEDULE:

Week	Dates	Topic	Assignments Due in Lab
1	Jan 17-19 (No class Monday)	Basic Statistics: Introduction to statistical software. Open lab this week.	
2	Jan 23-26	Leaf Pack Lab. Begin discussion of potential independent projects. Begin writing Introduction section of project report. Read Benfield (1996)	**Statistics report due.**
3	Jan 30-Feb 2	**Present Project Proposals**	
4	Feb 6-9	Nutrients in St. John's Creek.	**Introduction and Lit Cited drafts due** (written individually)
5	Feb 13-16	Population Growth in *Paramecium*	
6	Feb 20-23	Conclude *Paramecium* study. Work on independent projects.	**Nutrients report due.**
7	Feb 27-Mar 2	Basic Statistics: Regression and ANOVA. Biocide lab. Discussion of *Paramecium* data. Work on independent projects.	**Methods drafts due** (these may be written as teams).
8	Mar 6-9	Soils Analysis.	**Biocide report due.** ***Paramecium* report due.**
9	Mar 13-16	**Spring Break**	
10	Mar 20-23	Trip to Calvert Marine Museum (3/21 and 3/22)	**Soils report due (3/24)**
11	Mar 27-30	Cemetery Demography	**Results drafts due** (these may be written as teams).
12	Apr 3-6	Invertebrate and Fish Diversity. How to write an Abstract.	
13	Apr 10-13	Vegetation Analysis.	**Discussion drafts due** (written individually).
14	Apr 17-20	**Final Project Presentations**	**Vegetation report due.**
15	Apr 24-27	**Final Lab practical exam**	**Final written report due.**

More details about assignments and submissions can be found in the Laboratory Manual for Ecology and Evolution (Department of Biology, 2016).

Safety and Academic Honesty:

We believe that the well-being of our students is important, so please pay attention to instructions given to you by your instructor or teaching assistant. As in other biology courses, we expect all students to read the Biology Department Safety Manual and follow its directions. We also expect students to comply with College policies regarding academic honesty with special attention to plagiarism. The Biology Style Manual has a section on citations and plagiarism: *please read it*. We also expect students to act responsibly with their clickers. If a student is found using more than one clicker, the clickers will be seized, the student will be ejected from the classroom, and the owners of the clickers may receive a grade of F for the course.

Students with Special Needs

Students with special physical, learning, or other needs should contact the Office for Academic Services for specific information and assistance. St. Mary's College of Maryland provides services for students under the American with Disabilities Act of 1990 (ADA) and the Rehabilitation Act of 1973. Refer to the SMCM catalog for a complete description of this policy. If you have a documented disability and need reasonable accommodations to participate fully in course activities or meet course requirements, you must first contact the Office of Academic Services and then meet with your instructor within 2 weeks of receiving your accommodation letter to discuss needs and their implementation.

The Writing Center

The Writing Center, located in the Library Annex, offers free consultations for student writers at all levels and in all disciplines. No matter what you're writing and no matter where you are in the writing process (generating ideas, drafting, revising or proofreading), the peer tutors in the Writing Center can assist you. These tutors are friendly students and also excellent writers with special training as writing consultants. We encourage you to use the Writing Center as much as possible. You can make a one-time or weekly appointment with the Center by visiting their website, www.smcm.edu/writingcenter, and clicking 'Schedule an Appointment.' At the same website, you can find helpful resources on many writing-related topics.

Important Dates to Remember

These are all the assignments (lecture and lab) plus examinations scheduled during the semester.

Week	Dates	Item
2	January 23-26	**Lab: Statistics report due**
3	Jan 30-Feb 2	**Lab: Present Project Proposals**
4	February 6-9 Wed, February 8	**Lab: Introduction and Literature Cited sections due** **Phylogenetics Assignment due at beginning of lecture**
5	Monday, February 13 Friday, February 17	**Hardy-Weinberg Assignment due at beginning of lecture** **First Examination**
6	February 20-23	**Nutrients report due**
7	Feb 27-Mar 2 Friday March 3	**Lab: Methods sections due** **Population Dynamics Assignment due in lecture**
8	March 6-9	**Lab: *Paramecium* report due**
10	Friday March 24	**Lab: Soil report due**
11	March 27-30 Friday, March 31	**Lab: Results section due** **Second Examination**
13	April 10-13 Friday, April 15	**Lab: Discussion sections due** **Community Diversity Assignment due in lecture**
14	April 17-21	**Lab: Final Project Presentations; Vegetation-analysis report due**
15	April 25-27	**Lab: Final Lab Practical Exam** **Independent-project report due**
16	May 6 & 8	**Final Exams: Section 1 – Saturday, May 6, 9:00-11:15 AM** **Section 2 – Monday, May 8, 2:00-4:15 PM**

Good luck in the course! Be sure to see us if you have any questions!