Course Description

Biology 264: Community Ecology

Lectures: Tu Th 4:00 – 5:15 pm
107 Marsh Life Sciences

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Office Hours: Tu Th 9:30 am – 11:00 am or by appointment

Course Content. This course examines the structure and ecological dynamics of plant and animal communities. We will look at the question of how communities of interacting species are organized from three different perspectives: the theoretical perspective will emphasize the simple mathematical models that give us insight into community organization. The experimental perspective will illustrate how ecologists manipulate nature in controlled field and laboratory experiments to reveal mechanisms. The statistical perspective will emphasize the standard tools of analysis and inference that ecologists use to organize and understand their data.

Textbook. The assigned text for this course is *A Primer of Ecology* (Sinauer Associates), which is available from the book store. This is the same text that is used in BCORE 102 (Ecology & Evolution), although now we will cover some of the basic models in more depth. In addition, there are many required readings from the primary scientific literature that are conveniently available (for free) as .pdf downloads from the course website. I encourage you to print out hard copies of these papers so you can easily read and study them.

Course Structure. This course is organized around 12 major "modules" in which we will examine a major topic in community ecology for a single week. In the first class period for a module (usually on Tuesday), I will give a formal lecture that emphasizes the theoretical framework for this topic. For many of the modules, there is a corresponding chapter in the Primer that covers this material. In the second class period for the module (usually on Thursday), we will be discussing two papers from the scientific literature that represent empirical investigations of the topic.

Lecture Presentations. The lecture will begin with a brief review of foundational models and their underlying assumptions for a particular topic. I will assume that you are familiar with this material from BCORE 102, so we will move through it relatively rapidly. Next, we will develop more advanced models, usually by relaxing one or more of the (unrealistic) assumptions that the simple models are built upon. These advanced models will often generate new predictions and highlight novel mechanisms or alternative hypotheses for community interactions. For some modules in which there is not a unifying theoretical basis,

the lecture will discuss the qualitative hypotheses from the literature or provide a historical overview of the development of ecological thought on a particular topic. As in BCORE 102, I have a fast-paced lecture style, but I always encourage your questions at any time if the material is not clear to you.

Paper Discussions. For the paper discussion each week, we will put our chairs in a (large) circle for discussion. You will bring with you to class your typed paper assignment (see below) for that week's readings. To start the discussion, I will call on several people (randomly chosen) to read some of their questions out loud, and see if we can collectively answer them. We will work through the material for each paper, emphasizing the key elements and take home message of the paper (see "The Matrix"). At the end of the class period, I will try to summarize some important themes and elements that emerge from both of the papers.

Expectations and Pre-requisites. Most students find this course to be stimulating and worthwhile, but be forewarned that it is a lot of work, probably the equivalent of 4 units rather than 3. I expect you to actively listen and participate in both lectures and discussions, and class participation will constitute an important part of your grade. If you are looking for an easy upper division course to coast through your last semester at UVM, this is not the one to choose.

BCORE 102 (taught by me) and a calculus class are essential pre-requisites; an introductory statistics course will also be incredibly helpful. Students who have struggled with Bio 264 have not had this background. Students who have failed Bio 264 have not attended class and/or have failed to turn in assignments and participate in discussions.

Although this course is usually a mixture of undergraduates and graduate students, you should not be intimidated by the presence of graduate students in this upper-division course. The top grades in this course typically go to undergraduates. If you did well and enjoyed BCORE 102 with me, you should be well-prepared for this course.

Graduate Student Credit. Graduate students who take the course for 300-level credit will be required to lead one of the weekly paper discussions, and start the meeting with a 10-15 minute overview lecture on the paper topics. Graduate students will be graded based on the content of their presentation, their ability to answer student questions, and the overall quality of the discussion. An additional 50 points (equivalent to ½ of a midterm exam) will be assigned for the grade for graduate students.

Break. Our time slot of 1 hour and 15 minutes will be broken in two pieces. On lecture days, we will take a short break from 4:35 pm to 4:45 pm each day. I will begin speaking promptly again at 4:45 pm, so do not be late in returning if you leave the classroom for a few minutes. On paper discussion days, we will also take a 10 minute break, usually between the discussion of our two papers.

Writing Assignments: The Question & Summary Sheets. Each week, on the discussion day, you will need to have read the assigned papers and be ready to discuss them. At the end of

the afternoon, you will turn in your *Question & Summary Sheet* for each of the papers we have read. The *Question & Summary Sheet* consists of:

1) Three specific questions that are based on your reading of the paper. These questions might refer to the methods, analysis, hypotheses, or any other aspect of the paper that you did not understand and that interfered with your comprehension of the paper. You will certainly have more than three questions that will arise as you read each paper; choose those that are the biggest stumbling blocks to your understanding of the paper.

2) Summary. Write a 4 sentence summary of the entire paper. This short summary should use the following template for the four sentences:

I) This study was designed to (….your words).
II) The methods used were (…..your words).
III) The result was (….your words).
IV) The authors concluded that (….your words).

You can change the wording a bit if you like, but you must address these 4 elements in 4 sentences. The summary must be in your own words. It cannot be cut-and-pasted from the manuscript, nor can it be borrowed from your fellow students. However, I certainly encourage you to work with other students in the class to go over the papers together.

Remember, you need to turn in a set of 3 questions and a summary for EACH of the two papers we read every week. There are two restrictions on the writing assignment:

1) The *Question & Summary Sheet* cannot be turned in late for any reason; if you don't have it with you the day of class, you simply miss those points. *Question & Summary Sheets* also must be turned in by you personally when you attend class. You cannot give them to a friend and ask them to turn them in in your absence.

2) The *Question & Summary Sheet* must be typed. Hand-written *Question & Summary Sheets* will not be accepted.

If you follow these instructions, you will receive full credit for all of your *Question & Summary Sheets*, which constitute $1/6^{th}$ of your total grade.

Exams. Three exams will be given during the semester. Exams will consist of essays, problems, short answers, and definitions. Half of the exam questions will cover the lecture material and models from the Primer, and half of the exam questions will cover the course readings. Exams will emphasize the material since the previous midterm, but they are cumulative: you can expect some questions covering previous concepts or papers from earlier in the course. Exams will include specific questions from the readings and "The Matrix", to demonstrate your working knowledge of the papers that we have read and discussed. For example:

1) What experimental methods were used in Jones (1980)?

2) What hypotheses were tested in Smith (1995)?

3) What were the key conclusions in Porter (2004)?

4) What were the study organisms and where was the work conducted in Jules (1983)?

MAKE UP EXAMS WILL NOT BE GIVEN. The only possible exception would be a validated *medical* excuse from the Dean's office. However, you must contact me 24 hours before the exam in this case.

Final. As of the week before classes have begun, UVM STILL has not set the final exam schedule (!). The final will be comprehensive and cover material from all parts of the course. Following university policy, I cannot administer the exam early or at an alternate time from that posted in the exam schedule (whenever it eventually appears).

Grading. Grades will assigned on the following basis:

Exam I	100 points
Exam II	100 points
Exam III	100 points
Final Exam (cumulative)	100 points
Question & Summary Sheets	100 points
Attendance & Class Participation	100 points

Letter grades will not be assigned during the course. Instead, your grade will be based on an equitable curve of your total points.