

## Course Syllabus

IB 453 Community Ecology

Cross-listed as NRES 452

Credit Hours: 3

Pre-requisite: IB203 Ecology or equivalent, or consent of instructor

Instructor: Prof. James O'Dwyer, 183 Morrill Hall, Department of Plant Biology

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### Course description

Community Ecology explores the direct and indirect interactions among species and the environment that determine the structure and composition of plant, animal, and microbial communities. The course begins with discussion of classical theory developed around pairwise species interactions of competition, predation and mutualism, before scaling up to consider community structure at meso- and macro-scales, the importance of stochastic events and dispersal limitation, latitudinal diversity gradients and diversity-productivity relationships. Weekly discussions are held to critique classic and recent papers in community ecology. In the last two weeks of the semester students develop a proposal to explore in detail a species interaction of their choice, and develop a short presentation to the class.

### Recommended course texts:

#### Highly recommended:

Mittelbach Community Ecology. Sinauer Publisher 2012

<https://www.amazon.com/Community-Ecology-Gary-G-Mittelbach/dp/0878935096>

#### Also useful:

Gotelli Primer in Ecology. Sinauer Publisher (multiple editions are available)

[https://www.amazon.com/Primer-Ecology-Fourth-Nicholas-Gotelli/dp/0878933182/ref=pd\\_sbs\\_14\\_t\\_0?\\_encoding=UTF8&psc=1&refRID=ZSEZ02VM0JVZC7T2Z2WQ](https://www.amazon.com/Primer-Ecology-Fourth-Nicholas-Gotelli/dp/0878933182/ref=pd_sbs_14_t_0?_encoding=UTF8&psc=1&refRID=ZSEZ02VM0JVZC7T2Z2WQ)

### Student Learning Outcomes:

- (1) Describe the historical roots of community ecology that led to core concepts of how communities are structured.
- (2) Explain how the equations of simple species interaction models are derived, and how they can be used to predict the outcome of two species interactions: predation and competition.

(3) Identify, and evaluate the importance of processes that operate at scales larger than pairwise species interactions that contribute to community organization.

(3) Critique evidence for three current hypotheses for how species diversity is maintained in communities.

(4) Obtain familiarity and understanding of how scientific papers are organized, hypotheses are tested, and how data are presented effectively.

(5) Use experience of critiquing published literature, together with understanding of course content, to develop a novel hypothesis (or test of a hypothesis), and to present it in the context of previous work in the form of a written proposal.

#### Course calendar

Detailed information on weekly class topics, reading assignments, assignment due dates, pdf files of lecture notes, and a specimen mid-term exam are available on the course Moodle page.

#### Course grading

Mid-term exam: 15%

Final exam: 15%

Final essay (Questions are available in advance of the exam): 15%

Term paper presentation: 15%

Term paper write-up: 30%

Discussion participation: 10%

Extra Credit -- quizzes worth up to 5%

#### Course attendance policy

Students are expected to attend all classes. Failure to attend will result in the loss of the discussion participation grade and extra credit (potentially 15% of the grade). Attendance is recorded during the discussion section. Anticipated absences from class (e.g., graduate students doing fieldwork or attending meetings) must be discussed with me ahead of time for discussion work to be counted toward the final grade.

An absence letter or a request for accommodation is required under the following circumstances:

- (i) Prolonged illness or injury
- (ii) Illness, injury or death of a family member
- (iii) Observance of religious beliefs
- (iv) Volunteer emergency work
- (v) Compelling circumstances beyond your control

If you have questions call or send me an email.

Further information on student accommodations is available on the student code:

[http://studentcode.illinois.edu/article1\\_part5\\_1-501.html](http://studentcode.illinois.edu/article1_part5_1-501.html)

### Academic Integrity

According to the Student Code, 'It is the responsibility of each student to refrain from infractions of academic integrity, from conduct that may lead to suspicion of such infractions, and from conduct that aids others in such infractions.' Please know that it is my responsibility as an instructor to uphold the academic integrity policy of the University, which can be found here:

[http://studentcode.illinois.edu/article1\\_part4\\_1-401.html](http://studentcode.illinois.edu/article1_part4_1-401.html)

### Disability accommodations

To ensure that disability-related concerns are properly addressed from the beginning, students with disabilities who require assistance to participate in this class are asked to see me as soon as possible.

### Course topics, assignments and due dates (by week)

Week	Class Topic	Assignments and Labs	Week assignment due
1	Introduction to Community Ecology	-	-
	Competition modes and models	Competition discussion paper report	Friday, week 2
2	No class---MLK Day		
	Competition mechanistic models		
	Competition discussion		
3	Niche differentiation	Mutualism discussion paper report	Friday, week 3
	Mutualism		
	Mutualism discussion		
4	Mutualism II	Predation discussion paper report	Friday, week 4
	Predation		
	Predation discussion		

5	Predation II	Herbivory discussion paper report	Friday, week 5
	Herbivory		
	Herbivory discussion		
6	Trophic cascades I	Trophic cascades discussion paper report	Friday, week 6
	Trophic cascades II		
	Cascades discussion		
7	Mid-term review		
	Mid-term exam		
	No discussion this week		
8	Assembly rules	Community phylogenetics report	Friday, week 8
	Community phylogenetics		
	Phylogenetics discussion		
9	Diversity metrics	Invasive species discussion paper report	Friday, week 9
	Invasive species	Independent project outline	Friday, week 9
	Invasives discussion		
10	Island biogeography I	Island biogeography discussion paper report	Friday, week 10
	Island biogeography II		
	Island biogeog discussion		
11	Maintenance of diversity I	Diversity discussion paper report	Friday, week 11
	Maintenance of diversity II		
	Maintenance discussion		
12	Maintenance of diversity III	Neutral theory discussion report	Friday, week 12
	Neutral Theory		
	Neutral Theory discussion		
13	Latitudinal diversity gradients	Diversity gradient discussion report	Friday, week 13
	Diversity-productivity		

	relationships		
	Diversity gradient discussion		
14	Independent project presentations	-	
	Independent project presentations	-	
	Independent project presentations	Final independent project paper	Final project reports due Friday, week 14
15	Final Exam		