

## BIOL 607: Fundamentals of Ecology

### Syllabus

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(Office Hrs: T 1-5)

**Course Description and Goals:** This course provides an introduction to ecology for graduate students in the Environmental Science and Public Policy programs who have never had a formal course in ecology. In addition, there is an introduction to ecological research through the reading and analysis of journal articles. This course will provide students with the necessary background to pursue advanced graduate courses in ecology.

**Course Content and Instructional Methods:** The subject matter of this course is delivered in the form of lectures, textbook readings, and assigned journal articles.

Week	Topic	Readings
8/30	Physiological Ecology: Basic chemistry and physiology	B: Ch 2, J:Ch1
9/6	Physiological Ecology: Energy balance and life history of organisms	B: Ch 2
9/13	Physiological Ecology: Response to the environment	B: Ch 3, Journal article
9/20	Population Ecology: Population growth and regulation	B: Ch 4 Phys.Ecol.Journal Rev. due.
9/27	Population Ecology: Evolution, Predation	B: Ch 5-6
10/4	Population Ecology: Trophic interactions (Predation, Parasitism, Competition)	B: Ch 6-8, Journal article
10/11	NO CLASS : Fall break	Pop'n Ecol. Journal Rev. due.
10/18	MIDTERM EXAM	
10/25	Pop'n Ecology: Other Trophic interactions	B:Ch 9
	Community Ecology: Community structure	B:Ch10
11/1	Community Ecology: Community change	B:Ch13, Journal article
11/8	Ecosystem Ecology: Productivity and energy flow concepts	B:Ch11 Comm. Ecol. Journal Rev. due
11/15	Ecosystem Ecology: Biogeochemistry	B: Ch12, Journal article
11/22	NO CLASS: Thanksgiving break*	
11/29	Landscape Ecology	B: Ch 19
12/6	Selected Biomes	B:Ch15-18 Ecosys.Ecol. Journal Rev. due
12/13	Final exam	

\*by unanimous consent, we will meet 10-15 min longer each class to make up for 11/22 break

Readings listed are from:

*The Science of Ecology* by Richard Brewer. Saunders College Publishing. 2nd Edition. 1994.

Listed by chapter number as B:Ch\_.

*Environmental Biology* by Allan M. Jones. Routledge. 1997. Listed by chapter number as J:Ch\_.

This chapter has been made available to you.

**Methods of Evaluation:** Grades will be based on a midterm and a final, each counting 40%. The final will not be overtly cumulative, but will focus on the last half of the course. Each exam will consist of a series of factual, short “essay” questions focusing on the lecture material as well as at least one discussion questions which will require synthesis of lecture material and readings. The discussion questions will be handed out ahead of time to allow you time to think about your answers, but the answers themselves will be written during the test period. You will have 3 hours for each test.

In addition, each student will be required to write four short papers, 3-4 pages (double spaced) each reviewing a current ecological research paper. One paper will come from each of the four major sections of the course: physiological, population, community, ecosystem/landscape. Guidelines for these papers will be distributed. Each of these paper will count 5% of the final grade.

### Course Outline with Concepts

#### I. Ecology of Individual Organisms

##### Physiological ecology

Concepts: tolerance range, optima, acclimation, limiting factors, ecological indicators, energy balance, photosynthesis, respiration, storage, growth, reproduction [include some basic physiology]

Abiotic factors: temperature, moisture, light, soil, fire, nutrients, pollution

#### II. Population Ecology

##### Population growth and regulation

Concepts: birth rate, death rate, life tables, survivorship curves, population growth functions, carrying capacity, population pyramids, human populations

##### Evolution

Concepts: genotype, phenotype, evolution, natural selection, r and K selection, group selection, extinction

##### Trophic interactions

Concepts: herbivory, predation, optimal foraging, functional and numerical response, biological control, parasitism, saprobism, competition, mutualism

#### III. Community Ecology

##### Community structure

Concepts: dominance, diversity, spatial structure, ecological niche, assembly rules, guilds, ecotones

##### Community change

Concepts: disturbance, succession, climax, phenology, seasonal patterns

#### IV. Ecosystem Ecology

##### Productivity and energy flow

Concepts: food chain, food web, primary producers, primary production, secondary production, consumers, decomposers, decomposition, energy flow, biomass vs. production, ecological efficiency, detritus vs. grazing food chains, transport of production

#### Biogeochemistry

Concepts: nutrient cycling, hydrologic cycle, watershed studies, biological control of atmosphere and ocean