BIOL 410 – Population and Community Ecology

Syllabus – Fall 2015

Instructor

Ché Elkin, Room 8-332, 960-5004, che.elkin@unbc.ca
Office hours: Wednesday 9:30 to 10:30, or by appointment (che.elkin@unbc.ca)

Course webpage

http://www.unbc.ca/che-elkin/courses

Class meeting rooms and times

Lecture room	5-171
Lecture time	Tuesday and Thursday 14:30 to 15:50
Tutorial room	8-362
Tutorial time	Thursday 11:30 to 12:30

Course description

Plant and animal communities are often the biological scale at which conservation, management and resource use decisions are made. As such, there is an applied impetus to understand how interactions between organisms and their environment influence the location, density and dynamics of populations, and how interactions between species influences the composition and dynamics of ecological communities. This course is designed to provide students with an understanding of the theoretical foundations of population and community ecology, as well introducing the concepts and tools needed to address applied problems related to population management, conservation, and exploitation. Where possible, topical examples from plant and animal populations in B.C. will be used illustrate fundamental population and community concepts as well as applied management challenges and options. A primary focus of the course will be to introduce students to a range of quantitative frameworks that can be used to gain insight into the key factors that regulate populations and communities, and which can also be used to better understand their dynamics through time and space. This necessary quantitative focus of this course will require students to be comfortable using mathematical representations of populations and communities, and using quantitative tools.

Tutorial

The scheduled tutorial for this course is designed to provide students with the opportunity to ask questions and further explore lecture material and assignments. Tutorials will sometimes focus on critically evaluating and deconstructing published papers that focus on various aspects of population and community ecology. Tutorials will also involve the introduction and use of computer models and simulation techniques that are at the heart of the ecological tools discussed in lecture.

Text Books (suggested)

There are **no** text book requirements for this course; however, the following text is highly useful.

Gotelli, N.J. 2008. A Primer of Ecology (4rd Edition). Sinauer Associates, Inc.

Evaluation

Exams

A midterm worth 30% of the final grade will cover all lecture and tutorial material up until the exam. The final exam, worth 40% of the final grade and scheduled by the Registrars Office, will be comprehensive with more weight placed on material covered after the midterm.

Problem Sets

Four problem sets will be assigned that will require students to address questions related to material presented in lecture. Each problem set is individually worth 5% of the final grade (20% together), and will be due one week after the set is assigned.

Population Model Assignment

A population model assignment, worth 20% of the final grade, will require students to sequentially build a population model around a species of their choice. Sections of the model will be handed in throughout the semester. We will begin by defining the age/life-stage structure of the organism with which you are working, and use this information to estimate life-table information. We will then integrate effects of such processes as competition, predation, habitat quality, and interactions between these processes. You will also consider the potential interconnectivity of subpopulations through immigration/emigration and how this can affect persistence of the metapopulation. Finally, you will look for interconnections between the processes, and ultimately how this influences birth rates/death rates or immigration/emigration within your population.

Component	Grade
Midterm	25%
Problem sets	20% (4 x 5%)
Population Model Assignment	20%
Final	35%

Dishonesty and Professional Conduct

Purposeful dishonesty and plagiarism is a serious offence both in the class room and the work place. If you are unsure of what constitutes Plagiarism or Cheating please consult the UNBC Graduate Programs web site or instructor for definitions, explanation, and potential consequences. Ignorance is not a valid excuse. (http://www.unbc.ca/sites/default/files/sections/graduate-programs/unbcgraduatecalendarregulationonacademicoffences.pdf)

Other Details

The schedule of topics and assignments, as currently outlined in the syllabus, are subject to change with notification.

Persons with disabilities requiring special learning approaches should contact the instructor and Disability Services early in the semester (http://www.unbc.ca/disabilities/index.html).

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BIOL 410 Lecture topics 2016

Lecture	Topic	Date	Week
Lecture 1	Why population and community ecology?	Sept. 10	37
Lecture 2	Spatial and temporal distributions of organisms	Sept. 15	38
Lecture 3 Tutorial 1	Density-independent population growth Outline population modeling project	Sept. 17	
Lecture 4	Density-dependent population growth 1	Sept. 22	39
Lecture 5 Tutorial 2	Density-dependent population growth 2 Population growth	Sept. 24	
Lecture 6	Age structured population growth	Sept. 29	40
Lecture 7 Tutorial 3	Population sampling Life Tables	Oct. 1	
Lecture 8	Calculating vital rates	Oct. 6	41
Lecture 9 Tutorial 4 Due	Maximum sustainable yield Population size estimates Assignment 1	Oct. 8	
Lecture 10	Spatially structured populations :movement and migration	Oct. 13	42
Lecture 11 Tutorial 5 Due	Source sink populations Movement Model Part 1	Oct. 15	
Lecture 12	Metapopulations	Oct. 20	43
Exam Tutorial	**Midterm** No formal tutorial	Oct. 22	
Lecture 13	Population viability analysis	Oct. 27	44
Lecture 14 Tutorial 6 Due	Predation: Lotka-Volterra models Metapopulations Assignment 2	Oct. 29	
Lecture 15	Parasitoids and hosts	Nov. 3	45
Lecture 16 Tutorial 7 Due	Disease and SIR Predation Model Part 2	Nov. 5	
Lecture 17	Population cycles and other dynamics	Nov. 10	46
Lecture 18 Tutorial 8 Due	Island Biogeography Population cycles Assignment 3	Nov. 12	
Lecture 19	Community composition	Nov. 17	47
Lecture 20 Tutorial 9 Due	Community structure and dynamics Island biogeography Model Part 3	Nov. 19	
Lecture 21	Succession	Nov. 24	48
Lecture 22 Tutorial 10 Due	Management of populations and communities 1 Community metrics Assignment 4	Nov. 26	
Lecture 23	Management of populations and communities 2	Dec. 1	49
Lecture 24 Tutorial 11 Due	Review: Why population and community ecology Final exam preparation Model Part 4	Dec. 3	