ECOL 320 Ecological Systems

Centro Universitario Internacional

ECOLOGICAL SYSTEMS-Spring 2017

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Course Information
Spring 2016
Monday and Wednesday- 09:00-10:20
Monday and Wednesday- 16:00-17:20

Office Hours:
Mondays and Wednesday 11:00-14:00

Course Description

The course includes basic concepts in Ecology moving from the organism level to the biosphere, including populations, communities, biomes and landscapes. Especial importance is given to processes and adaptations taking place in the Mediterranean type of ecosystems. The course also includes practical activities that led the student to learn by doing and applying the knowledge explained in the lectures.

Prerequisites

No previous knowledge on Ecology is strictly needed, although some biological background is desired.

Course Goals and Methodology

The course aims to introduce the student to the science of Ecology. We will focus on the study of ecosystems, their components and the interactions between biotic and living organisms. Students will learn about large-scale patterns and processes in ecology with particular emphasis on the role that time and space play in the ecosystems formation and functioning. The course also focuses on the application of ecological principles in solving environmental problems. The course will concentrate on organisms, individuals, populations and communities with examples from many areas of the world, particularly from the Mediterranean region and Mediterranean areas.

Learning Objectives

This course is intended for Biological Science majors & minors and for students who required a science base course. The course will examine the structure and function of ecological systems, including individuals, populations, communities, and ecosystems, and the influence of society on the biosphere. By the end of the semester, students who complete all necessary assignments will be able to:

1. Understand major concepts and terminology in the field of ecology.
2. Identify mechanisms of adaptation to arid environments
3. Comprehend the methods and application of ecological research.
4. Evaluate human interactions with nature and effects on natural systems.
5. Produce a scientific paper from experimental design and data gathering to writing up

Required Texts

The course materials will be uploaded to the course's page on Backboard Learn platform, from where the students can access them.

Basic Bibliography

Beeby, A. and Brehnnan, A.M. (2004). *First Ecology*. Second Edition. Oxford University Press, 317.

Begon, M., Harper, J.L. & Townsend, C.R. (1996) *Ecology*. Third Edition. Blackwell Science. Milan, Italy. 1143p.

Colinvaux, P. (1993) *Ecology 2*. First Edition. John Wiley & Sons, Inc. New York. 688 p.

Dodson, S.I. *et al.* (1998) *Ecology*. First Edition. Oxford University Press, Inc. New York. 433p.

Kormondy, E.J. (1996) *Concepts of Ecology*. Fourth Edition. Prentice Hall. New York. 559 p.
Krebs, C.J. (1994) Ecology. Fourth Edition. Harper-Collins. New York.

Molles, M.C. (2002) *Ecology: Concepts and Applications.* Second Edition. McGraw-Hill Companies, Inc. United States of America. 586 p.

Smith, R.L. & Smith, T.M. (2001) *Ecology and Field Biology*. Sixth Edition. Addison Wesley Longman, Inc. United States of America. 771 p.

Smith, R.L. & Smith, T.M. (2000) *Elements of Ecology.* Fourth Edition. Addison Wesley Longman, Inc. United States of America. 567 p.

Multimedia support

Available at UPO library (name of DVD or CD-ROM followed by library code)

- Biomes, 551 BIO
- Ecology, 504 ECO
- Desertification, 504.5 DES
- Living things & their environments, 574 LIV
- Population Genetics & Evolution, 575 AP

Stiling, P.D. (1992) *Ecology. Theories and Applications*. Second Edition. Prentice Hall. New Jersey. 539 p.

Voght, K.A. et al. (1996) *Ecosystems. Balancing Science with Management*. First Edition. Springer-Verlag. New York. 470 p.

General Course Policies

* Please keep your cell phones turned off during class.
* No computers, tablets or phones during the class are allowed. Their use will be considered as a lack of participation and as such, it may affect the final grade of students using those devices.
* All assignments will be handed in as a hard copy.
* Appointments with the instructor can be made face to face or via e-mail.
* Class participation is an important learning method that will be continually used and evaluated.

Course Requirements and Grading

Assessment will involve a mid term and a final exams (all written) and a final paper that will be evaluated through its content and through an oral presentation (in pairs/small groups) on a relevant set topic based on lab and field-work. (N.B. students will be graded individually). Finally, students will be required to complete assigned readings/summarize articles etc outside class and to actively participate in class discussions, which will be reflected in their 'participation' grade. (N.B.: 'being there' does not = 'participation').

Midterm Exam	20%
Home work	30%
Final Exam	25%
Class Participation	10%
Final Paper	15%

Assignments to be completed by students:

There will be seven assignments worth a total of 3 points (30%) towards your final grade. Detailed instructions for each assignment will be given in class. Dates for assignments to be completed will be announced in class with time enough for the students to complete them all in a confortable way. One of the assignments will be on plant competition and students will produce their own data to write up the compulsory final paper. All students will complete all minimum calculations and answers to posed questions in each activity. Students choosing a particular topic will conduct specific research on it and will gather extra data and/or information to produce the final paper.

Assignments

Organisms in their Environment and Ecological Niche	(0.25)	} = 30%
Climate Diagram	(0.25)	
Soil Respiration	(0.75)	
Oral Presentation on Biomes (Biogeography of Earth)	(0.75)	
Distance methods	(0.50)	
Lincoln Index (Mark-Recapture)	(0.25)	
Life Tables	(0.25)	

Final Paper on plant competition (15%)

Attendance and Punctuality

Attendance is mandatory. More than 3 unexcused absences will result in the lowering of the final grade. Students with more than 3 such absences may not challenge the final grade received. Punctuality is required – lateness will be penalized by 0.5 (over 15 mins) or 1 absence (over 30mins).

Missed or Late Work

Assignments handed in later than 24 hours after the dead line will not be evaluated. Assignments handed in within the first 24 hours after the dead line will count half of their maximum value. Similarly, missing any or the oral presentation that the students have to deliver in class will count as zero.

Academic Dishonesty

Academic integrity is a guiding principle for all academic activity at Pablo de Olavide University. Cheating on exams and plagiarism (which includes copying from the internet) are clear violations of academic honesty. A student is guilty of plagiarism when he or she presents another person's intellectual property as his or her own. The penalty for plagiarism and cheating is a failing grade for the assignment/exam and a failing grade for the course. Avoid plagiarism by citing sources properly (using footnotes or endnotes and a bibliography).

Students with Disabilities

If you have a disability that requires special academic accommodation, please speak to your professor within the first three (3) weeks of the semester in order to discuss any adjustments. It is the student's responsibility to provide the International Center with documentation confirming the disability and the accommodations required (if you have provided this to your study abroad organization, they have most likely informed the International Center already but please confirm).

Behavior Policy
Students are expected to show integrity and act in a professional and respectful manner at all times. A student's attitude in class may influence his/her participation grade. The professor has a right to ask a student to leave the classroom if the student is unruly or appears intoxicated. If a student is asked to leave the classroom, that day will count as an absence regardless of how long the student has been in class.

Class Schedule

1. **Introduction.-** Main concepts in Ecology.

2. **The organism and its environment.-** Environmental conditions. Effect of Temperature on organisms. Moisture and water availability ecology. Zonation. Nutrients.

3. **Climate change.-** Mean atmospheric temperatures. Sources of atmospheric carbon. Ecological changes due to climatic variations.

4. **The biogeography of Earth.-** Ecosystem patterns. Tropical biomes. Temperate biomes. Boreal biomes. Aquatic ecosystems.

5. **Population Ecology and interactions.-** Properties of populations: density, dispersion of individuals, age structure. Population growth and regulation. Immigration and emigration. Intra-specific competition. Types of interactions. Competition**.** Predation, parasitism, mutualism, commensalism. Coevolution. r-selection and k-selection.

6. **Communities Ecology.-** Main types of communities. Community structure. Biodiversity. Geographical gradients. Pattern of successional changes. Primary succession. Secondary succession. Mechanisms of Successional Change. Climax, the end point of Succession. Man in nature: effects and exploitation of natural resources.

7. **Ecosystems Ecology**.- Production in Ecosystems**.** Trophic structure. Energy and nutrient flow. Biogeochemical cycles: carbon, nitrogen, water, phosphorous.

CALENDER:
Midterm Exam: 08 of March, Wednesday

Presentation on Biomes (Biogeography of Earth): 01 and 06 of March
Final paper due: 10th of Mary

Final Exam: April 27th

This semester the course will end by the end of April. That means that the classes of the last week in May will be taught in advance on the Fridays 27th of January and 03th of February. Classes will be held from 9:00-10:20 for the group in the morning and from 10:30 -11:50 for the group in the afternoon. The venue will be announced in class beforehand.

Holidays:
Monday, February 27: 'Hispanidad' day
April 10-14 – Holy Week (Semana Santa)
Monday, May 1st: Labor Day
May 1-5 – Feria de Abril

Course Schedule

Week 1: Course presentation and introductory class. Lesson 1
Week 2: Lesson 1- Reading on Organisms in their environment. Lesson 2 starts -The organism and its environment
Week 3: Lesson 2 cont. Activity on Climatic diagrams. Distance methods to estimate distribution of organisms. Field work on Soil Respiration Lab (on campus).
Week 4: Work on soil respiration calculations.
Week 5: Climate change and its consequences
Week 6: Class presentation on Biogeography. Review for mid-tem (overview of what will be covered for the mid term). Dead line to hand in calculations on Soil Respiration Lab.
Week 7: Mid term.
Week 8: Lesson 4. Populations Ecology- Introduction to demography.
Week 9: Lesson 4 cont. Life tables. Dead line to hand in Life tables.
Week 10: Lesson 4- Populations growth models.
Week 11: Lesson 5- Ecological Interactions. Reading on Ecological interactions Community Ecology
Week 12: Lesson 6- Community Ecology.
Week 13: Lesson 7- Ecosystems Ecology
Week 14: Review for the final exam (overview of what will be covered for the mid term). Final. Students will hand in their papers on the final report on the last day of class or on the same day as the final

The exact dates when assignments are due will be announced in class with plenty of time for students to be able to complete them. As a general term, students will be given a week to complete each assignment.

This syllabus is subject to change.