



UNIVERSIDAD PABLO DE OLAVIDE

Centro de Estudios para Extranjeros – Programa de Estudios Hispánicos

ECOL 320 - ECOLOGICAL SYSTEMS

Name: Alfredo Luque García

Tutorial days: An appointment is required.

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Aim: introduce the Science of Ecology, focusing on major concepts, to present the student with a manageable synthesis of the subject. The course will concentrate on individuals, populations and communities, their relationships with the physical and chemical environment, and with other organisms. Thus, we will study large scale patterns and processes, involving the role that time and space play in the ecosystems. Finally, the course will dedicate some time to understand how of ecological principles can be used in solving environmental problems. Whenever possible, teaching will be focused on the Mediterranean region and Mediterranean ecosystems.

Evaluation: There will be two exams during the term, a mid-term exam and a final exam, which will count 25% of the final grade each one. Lessons include discussion sections and students must take part in them. Their participation will be monitored along the term and it will count as 20% of the final grade. Homework will count as 10% of the final grade and a paper will contribute 20% to the final grade. There will be one field trip, in which we will see and apply the concepts studied in class through dynamic activities and field work techniques. These field trips will allow the students to get close to the Mediterranean nature. Missing field trips will decrease the final grade in a 10% reduction.

Attendance at lecture is required and will be checked. It is important to understand the facts and concepts of each lecture in order to be adequately prepared for following lectures. More than three unexcused absences will result in a 10% reduction the final course.

PROGRAM:

1. **Introduction. What is Ecology?** Main concepts. Ecological processes in the Mediterranean region.
2. **Natural selection and speciation.** Life on Land: Large-Scale Patterns of climatic variation. Natural history and Geography of Biomes. Climatic diagrams. Life in Water: the hydrologic cycle; the natural history of aquatic environments.
3. **The organism and its environment.** Temperature Relations: Microclimates; Temperature and Performance of Organisms; Climatic Warming. Water Relations: Water availability; Water regulation in land; Water and salt balance in aquatic environments.
4. **The ecosystem: how it works.** Energy and nutrient flow. Primary Production Nutrient cycling and retention. Succession and Stability.
5. **Population Ecology.** Population growth: geometric and exponential population growth. Logistic Population Growth. Limits to Population. Intra-specific competition.
6. **Competition and coexistence.** Resource competition. Competition and Niches. Predation, Herbivory, Parasitism, Mutualism, Commensalisms. What is the meaning of Co-evolution?
7. **Community ecology.** Species Abundance and Diversity. Biodiversity. Geographical gradients. Island Biogeography. Speciation.
8. **Global Ecology.** Disturbances. Succession. El Niño. Changes in Land Cover. Human influence on Atmospheric Composition. Applications on conservation.

Required Text

The course packet will be available at the Copistería in the Celestino Mutis Building.

Basic Bibliography

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. 559p.

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.

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.

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