ECOSYSTEM MODELLING (2015-16)

GENERAL INFORMATION

Code 26538

ECTS Credits 6

Departments and areas

Department	Area	Area	Report R.
Agrochemistry and Biochemistry	SOIL SCIENCE AND AGRICULTURAL CHEMISTRY		
ECOLOGY	ECOLOGY	YES	YES

Studies

DEGREE IN BIOLOGY

Context of subject

Modelling Ecological Systems is a training course in the Supplementary Compulsory module type that is taught in the 3rd year (sixth semester) Grade Biology. Its main objective is to understand the functioning of ecological systems, with special emphasis on biogeochemical cycles. This subject is related to other subjects such as ecology, oceanography, geology and plant physiology, and it provides a framework for facilitating student approach to other areas as soil science, toxicology or agrobiology. Knowledge of the philosophy and practice of modeling will be an invaluable tool during later courses and along student's professional careers.

This subject will be especially interesting for training future biologists for three reasons. (1) It provides fundamental knowledge on nutrient cycling, carbon and water. (2) It promotes a systemic vision of ecosystems, landscapes and the planet. (3) It provides practical information on models and modeling.

OBJECTIVES

Subject objectives/competences (2015-16)

1. Identify the main elements that characterize the main systems and models in ecology.

2. Correctly apply analysis techniques and layout of the structure and relationships between system components.

3. Study the main biogeochemical cycles and their processes, and identify alterations causing current environmental problems.

4. Learn the main analysis techniques for the study of biogeochemical processes.

5. Gain experience in working in a biogeochemistry laboratory, including planning and security measures.

6. Apply acquired knowledge and skills by developing simple ecosystem models, and study specific environmental problems, simulating management measures.

7. Get introduced to the main simulation models for solving environmental problems.

CONTENTS

Theoretical and practical contents (2015-16)

Theory

Unit 1: Theoretical basis for modeling
T1.1. Systems theory in ecology.
T1.2. Dynamic analysis of ecosystems: Causal diagrams.
T1.3. Functional analysis of the system: Flow Chart.
T1.4. Building dynamic models.

Unit 2: Introduction to biogeochemistry.
T2.1. Biogeochemical cycles.
T2.2. Hydrological cycle. Hydrological models: Afforestation and erosion.
T2.3. Carbon cycle. Models of organic matter: Carbon sequestration.
T2.4. The cycle of Nitrogen and other elements.

Computer Training (21 hours)
O1. Introduction to modeling.
O2. Software for modeling.
O3. General models focused on carbon and nitrogen.
O4.Hydrological models.

Laboratory practice (20 hours)
L1. Organization, preparation of soil samples and reagents.
L2. Analysis of functional organic carbon fractions.
L3. Analysis of N fractions.
L4. Data treatment and discussion.

EVALUATION

Instruments and criteria of Evaluation 2015-16

Attendance at theoretical sessions is not mandatory. However, evaluable written tests will be performed during regular classes. Attendance at tutorials and practical classes is compulsory and will be evaluated during delivery. Grades will not be saved for later academic years except for lab and computer reports. A grade higher than 4 in the final test will be needed to pass the course.

Type	Criterion	Description	Ponderation
FINAL TEST	Se realizará un examen teórico-práctico, compuesto por preguntas de respuesta múltiple, preguntas de desarrollo y ejercicios.	Prueba final	40
ACTIVITIES OF EVALUATION DURING THE SEMESTER	Se solicitará la resolución de problemas y la respuesta a breves cuestionarios durante las sesiones teóricas.	Ejercicios y cuestiones	20
ACTIVITIES OF EVALUATION DURING THE SEMESTER	Se solicitará un informe o cuestionario relacionado con cada una de las prácticas.	Informes peródicos prácticas laboratorio	20
ACTIVITIES OF EVALUATION DURING THE SEMESTER	Se solicitará un informe o cuestionario relacionado con cada una de las prácticas.	Informes periódicos prácticas ordenador	20