COURSE DATA

DATA SUBJECT

Code: 33083
Name: Ecology
Cycle: Undergraduate Studies
ECTS Credits: 9
Academic year: 2026-27

STUDY (S)

Degree	Center	Acad. year	Period
1104 - Degree in Environmental Sciences	Facultat de Ciències Biològiques	2	Second quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1104 - Degree in Environmental Sciences	Ecology	COMPULSORY

COORDINATION

ARMENGOL DIAZ JAVIER

BARBA CAMPOS EMILIO

SUMMARY

"Ecology" is an obligatory subject taken in the second year of the Bachelor's Degree in Environmental Sciences. The subject has a total of 9 ECTS, which are taught in the second term. The subject is included in the module "Scientific bases of the natural environment". Ecology can be defined as the science that studies the relationships of living beings with each other and with the environment. "Ecology" is therefore a synthesis subject that must integrate knowledge obtained in other subjects ("Botany", "Zoology", "Geology", etc.) which provide knowledge about the different living beings and the environment in which they live. In addition, "Ecology" forms the basis of other specialisation subjects belonging to the same area of knowledge or to other areas, which in turn can complement it. The subject, whose object of study is interactions of living beings with the environment, must constitute one of the basic pillars of the training of environmentalists.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS

COMPETENCES / LEARNING OUTCOMES

1104 - Degree in Environmental Sciences

Comprender y manejar diferentes escalas espaciales y temporales en la interpretación de los sistemas naturales.

Conocer las características y los procesos generales de los principales ecosistemas y hábitats.

Conocer los principales impactos humanos sobre los sistemas naturales.

Conocer y dominar los procedimientos para estimar e interpretar la biodiversidad.

DESCRIPTION OF CONTENTS

1. Introduction

1. What is ecology? Overview of ecology. The use of field studies to test theory. Contributions of field and laboratory studies. Inventories and large-scale experiments. Pollen record information and modelling. The nature and scope of ecology.

2. Population genetics and natural selection. Variation within populations. Hardy-Weinberg equilibrium model. The process of natural selection. Evolution by natural selection. Changes due to chance.

2. Physiological and behavioural ecology

3. Relationships with temperature. Microclimates. Temperature and the function of organisms. Body temperature regulation. Survival at extreme temperatures.
4. Water relations. Water availability. Water regulation in terrestrial environments. Water and salt balance in aquatic environments.
5. Energy and nutrient relationships. Energy sources. Energy limitation. Optimal provisioning theory.
6. Social relationships. Choice of partners. Sociability.

7. Distribution and abundance of populations. Distribution limits. Distribution patterns. Metapopulations. Size of organisms and population density. Frequency and rarity.

8. Population dynamics. Survival patterns. Age distribution. Rates of population change. Dispersal.

9. Population growth. Geometric and exponential population growth. Logistic population growth. Limits to

3. Population ecology

7. Distribution and abundance of populations. Distribution limits. Distribution patterns. Metapopulations. Size of organisms and population density. Frequency and rarity.

8. Population dynamics. Survival patterns. Age distribution. Rates of population change. Dispersal. populati on growth. The intrinsic rate of growth.

10. Life histories. Number of offspring versus size. Adult survival and reproductive allocation. Classification of life histories.

4. Interactions between populations

11. Competition. Competition for resources. Niches. Mathematical and experimental models. Competition and niches.

12. Exploitation: predation, herbivory, parasitism and disease. Complex interactions. Exploitation and abundance. Dynamism. Refugia.

13. Mutualism. Mutualism in plants. Mutualism in corals. Evolution of mutualism.

5. Community and ecosystem ecology

14. Abundance and diversity of species. Species abundance. Species diversity. Environmental complexity. Disturbance and diversity.
15. Species interactions and community structure. Networks of interactions. Keystone species. Alien predators. Mutualistic keystone species.

16. Primary production and energy flow. Patterns of terrestrial primary production. Patterns of aquatic primary production. Influence of consumers. Trophic levels.

17. Circulation and retention of nutrients. Decomposition rates. Organisms and nutrients. Disturbance and nutrients.

18. Succession and stability. Changes in communities during succession. Changes in ecosystems during succession. Mechanisms of succession. Stability of communities and ecosystems.

19. Landscape ecology. Landscape structures. Landscape process. Causes of landscape structure and change.

20. Geographical ecology. Area, isolation and species richness. The equilibrium model of island biogeography. Latitudinal gradients of species richness. Historical and regional influences.

21. Global ecology. A global system. Human activity and the global nitrogen cycle. Land cover changes.

6. Large-scale ecology

19. Landscape ecology. Landscape structures. Landscape process. Causes of landscape structure and change.

20. Geographical ecology. Area, isolation and species richness. The equilibrium model of island biogeography. Latitudinal gradients of species richness. Historical and regional influences.Human influence on atmospheric composition.

7. Practical sessions

Practice 1. Description of a habitat: estimation of physical-chemical and biological parameters in a stretch of river. Calculation of the River Habitat Index. Techniques for capturing and characterising aquatic macroinvertebrate communities in a river.

Practice 2. Methods for the study of sessile organisms and plant populations, estimation of population size, distribution of populations in space and estimation of diversity.

Practice 3. Surveys of mobile organisms: Line transects.

Practice 4. Surveys of mobile organisms: Schnabel's method of capture, marking and recapture.

Practice 5. Estimation of the prevalence and population intensity of a parasitic species.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Tutorials	4,00
Theory	54,00
Laboratory	32,00
Total hours	**90,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	15,00
Independent study and work	30,00
Preparation of lessons	55,00
Preparation for assessment activities	35,00
Resolution of case studies	0,00
Total hours	**135,00**

TEACHING METHODOLOGY

ATTENDANCE TO THEORY CLASSES

The 21 topics of the theoretical programme will be explained in theory lessons. Each topic will be developed in one or two sessions of one hour and will consist of the presentation of contents by the professor, formulation of questions and discussion of the answers. In these presentations, attention will be paid to the interpretation of tables and figures, and to methodological aspects, highlighting the most general aspects, and illustrating these with cases. Attendance is compulsory, and may be verified by the lecturer on any day of class.

ATTENDANCE AND PRESENTATION OF SEMINARS

During the presentation session, the teacher will suggest a list of seminar topics, which students will be divided into groups to prepare (see below). These topics will be presented during the hours devoted to this activity, and will be discussed by the class as a whole. These are ecology seminars, although the list prepared by the teacher will pay attention to topics where ecology interacts with other sciences. Attendance is compulsory, and can be verified by the teacher on any day of class.

PREPARATION OF THE SEMINAR

The groups will be established by mutual agreement of the students, with the exception of 4 persons. If a student is left without a group, the teacher will assign him/her to one of the groups. In order of demand, the groups will choose a topic from the list of topics prepared by the theory faculty. The list prepared by the teaching staff will be ordered in such a way that this order will determine the chronology of the presentations. The group will prepare a computer-based presentation. The group will present its presentation in no more than 10 minutes, followed by a discussion.

PREPARATION OF THEORY LESSONS

The time that the student must dedicate to the advance preparation of the theory lessons is counted here. The didactic material (projections and script of the subject) for each theory lesson will be available online at least one week before the lesson takes place.

ATTENDANCE TO PRACTICAL CLASSES

The practical sessions of the course will take place in the field, ideally in a 3-day field trip. During these

days, the practices set out in the syllabus will be carried out. Attendance is not compulsory but highly recommended and will be positively valued. The teacher will call roll to confirm attendance.

ATTENDANCE TO GROUP TUTORIALS

During the course there will be 4 one-hour group tutorial sessions. In these sessions, various aspects related to the course will be presented and discussed, such as the presentation of the course and how it is organised, the organisation and contents of the practicals, details of how to prepare the seminars, etc. Attendance is compulsory, and the teacher will take a roll call to confirm attendance.

EXAM PREPARATION STUDY

Independent study by the student.

TAKING OF EXAMS

Partial tests of the theoretical part of the subject may be taken during the course and an exam will be held at the end of the term. The practical part will be assessed by means of one or more written tests that may include exams, assignments, practical reports and/or presentations.

USE OF THE VIRTUAL CLASSROOM (http://aulavirtual.uv.es).

The e-learning platform AULA VIRTUAL of the University of Valencia will be used for all activities. The main tools to be used will be:

- *E-mail*. Aula Virtual, through its email module, will allow fluid communication between student-teacher. The teacher will continuously use this medium to inform the student of any aspect related to the development of the subject.

IMPORTANT: only emails from the University of Valencia email account (alumni.uv.es) will be accepted. 'Hotmails' or other email accounts will be automatically deleted.

- *News*. The news module will be used as a regular means of information. Upon entering the Virtual Classroom, the student will immediately see any news related to the subject.

- *Resources*. The resources folder will be the place where subject materials will be deposited: reference sources, images, animations, tutorials, practice scripts, course calendars, etc.

EVALUATION

The following distribution of a maximum of 100 points is proposed (50 POINTS MUST BE REACHED TO PASS THE COURSE):

- Examination of the theoretical part: **60 points**
- Practical exam: **25 points**
- Attendance and participation in activities (theory classes, practicals, tutorials and seminars): **15 points.**
- TOTAL **100 points**

In order to pass the course, a minimum of 50 points must be obtained by adding up the different sections. In order to be able to add them up, the student must achieve at least forty percent (4 out of 10) of the maximum points for each of them. The marks for each section will only be retained for the second sitting of the same academic year.

In order to apply for an advance sitting of this subject, the student must take into account that he/she must have reached the minimum score in the sections related to attendance and participation in the activities indicated in this teaching guide.

REFERENCES

- Begon, M., Harper, J. L. y Townsend, C. K. 1999. Ecología. Individuos, poblaciones y comunidades. 3ª ed. Omega, Barcelona.
- Begon, M. y Townsend, C. K. 2021. Ecology. From individuals to ecosystems. 5ª ed. Wiley, Oxford. -Bowman, W. D. y Hacker, S. D. 2021. Ecology, 5ª ed. Sinauer/Oxford Univ. Press, New York.
- Brewer, R. y McCann, M. T. 1982. Laboratory and field manual of ecology. Saunders College, Philadelphia.
- Brower, J. E., Zar, J. H. y von Ende, C. N. 1997. Field and laboratory methods for general ecology, 4ª ed. McGraw-Hill, Boston.
- Cox, G. W. 1996. Laboratory manual of general ecology, 7ª ed. Brown, Dubuque.
- Krebs, C. J. 2014. Ecology: The experimental analysis of distribution and abundance. 6ª ed. Pearson, Essex.
- Molles, M. C. 2005. Ecología. Conceptos y aplicaciones, 3ª ed. McGraw-Hill/ Interamericana, Madrid.
- Ricklefs, R. E. 1988. Invitación a la ecología: La economía de la naturaleza. Panamericana, Buenos Aires.
- Rodríguez, J. 2016. Ecología, 4ª ed. Pirámide, Madrid. -Smith, R. L. y Smith, T. M. 2001. Ecología, 4ª ed. Addison-Wesley, Madrid. -Stiling, P. D. 2014. Ecology. Global insights and investigations,

2ª ed. McGraw-Hill, New York.
- Sutherland, W. J. (ed.) 2006. Ecological census techniques, 2ª ed. Cambridge Univ. Press, Cambridge.