

**COURSE DATA****Data Subject**

Code	33095
Name	Environmental impact assessment
Cycle	Grade
ECTS Credits	9.0
Academic year	2022 - 2023

Study (s)

Degree	Center	Acad. year	Period
1104 - Degree in Environmental Sciences	Faculty of Biological Sciences	3	Second term

Subject-matter

Degree	Subject-matter	Character
1104 - Degree in Environmental Sciences	151 - Environmental impact assessment	Obligatory

Coordination

Name	Department
CARBO VALVERDE, ESTER	25 - Plant Biology
SACRISTAN MORAGA, DANIEL	25 - Plant Biology

SUMMARY

The Environmental Impact Assessment course is a compulsory subject taught in the third year of the Degree of Environmental Sciences, within the Module V Management and Environmental Quality, and comprises a total of 9 credits. It is a methodological subject on whom it is intended that students acquire the basic knowledge to develop the procedure of environmental impact assessment of projects, as well as the concept of strategic environmental assessment that refers to apply environmental impact assessment to plans, programs and policies. In this context, with the completion of the course students should develop abilities and skills to address the contents of an environmental impact study in accordance with the laws and regulations in individual cases in the affected territory.

The course has a methodological and theoretical-practical type, so that knowledge of theoretical concepts are developed and applied in practical sessions on resolving issues and problems. Furthermore, performing work in seminars the students will present and discuss procedures and methodologies from publications in scientific papers, and processed in real studies on the regional or state administration.



The basic lines contained in the program are developed around the concepts of environmental impact assessment and introduction of strategic environmental assessment, as complementary and necessary to control anthropogenic environmental actions at all levels of land use planning, focusing on the content to be developed in studies of environmental impact as provided by applicable law, and including methods and techniques to address the different phases and stages of such studies. Specifically, the Program is divided into 5 sections and 13 topics and related practices (see description contained in point 6):

SECTION I. CONCEPTUAL AND LEGAL FRAMEWORK (Topics 1, 2)

SECTION II. CONTENTS OF AN ENVIRONMENTAL IMPACT STUDY (Topics 3, 4, 5 and 6)

SECTION III. METHODS AND TECHNIQUES FOR IDENTIFICATION, EVALUATION AND INTEGRATION OF ENVIRONMENTAL IMPACTS (Topics 7, 8, 9, 10 and 11)

SECTION IV. PROGRAM OF ENVIRONMENTAL MONITORING (Topic 12)

SECTION V. INTRODUCTION TO STRATEGIC ENVIRONMENTAL ASSESSMENT (Topic 13)

PREVIOUS KNOWLEDGE

Relationship to other subjects of the same degree

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

Other requirements

To have completed or be enrolled in all subjects of the modules "General Scientific Bases" and "Scientific bases of the natural environment "and the subject" Environmental Law and public administration ".

OUTCOMES

1104 - Degree in Environmental Sciences

- Capacidad de identificar y valorar impactos ambientales y de aplicar el procedimiento de evaluación de impacto ambiental.
- Conocimientos básicos sobre evaluación ambiental estratégica.

LEARNING OUTCOMES

With the completion of the course students should acquire the basic knowledge necessary for:

- (1) Understand the fundamentals of the Environmental Impact Assessment (EIA) and its scientific basis,
- (2) Analyze the EIA legislation for use in the preparation of Environmental Impact Studies (EIS),
- (3) Develop the process and content of an Environmental Impact Study,



- (4) Design procedures for the inventory, mapping and development systems based on environmental indicator for assessing environmental impacts,
- (5) Develop and implement criteria and methodologies for quality and vulnerability assessment of natural resources as a basis for assessing environmental impacts,
- (6) Apply the existing methods and techniques for the identification and assessment of environmental impacts,
- (7) Comment and discuss the advantages and disadvantages of the methods and techniques for the identification and assessment of environmental impacts,
- (8) Know the limitations in the assessment of environmental impacts and procedures to try to address them,
- (9) Apply methods and techniques for the aggregation of environmental impacts, and for the evaluation and comparison of alternatives,
- (10) Know the legal mechanisms for public participation in EIA and procedures to facilitate implementation,
- (11) Establish protective and corrective measures and the corresponding Environmental Monitoring Plan,
- (12) Know the basic principles, the legislative framework and procedure for applying Strategic Environmental Assessment (EIA).

DESCRIPTION OF CONTENTS

1. TOPIC 1. INTRODUCTION TO ENVIRONMENTAL IMPACT ASSESSMENT (EIA). (SECTION I. CONCEPTUAL AND LEGAL FRAMEWORK)

Origin and history of the Environmental Impact Assessment (EIA). Concept of Environmental Impact. Characteristics and properties of environmental impact. Conceptual models in EIA. Spatial planning and EIA. Approaches to EIA. Uncertainty and subjectivity in EIA.

2. TOPIC 2. LEGISLATION ON ENVIRONMENTAL IMPACT ASSESSMENT. (SECTION I. CONCEPTUAL AND LEGAL FRAMEWORK)

EIA legislation in the European Union. EIA legislation in Spain. EIA legislation in Valencian Region. Administrative procedure. Status of EIA.

3. TOPIC 3. CONTENT OF AN ENVIRONMENTAL IMPACT STUDY (EIS). (SECTION II. CONTENTS OF AN ENVIRONMENTAL IMPACT STUDY)

Project description and actions. Analysis of alternatives. Environmental Inventory and description of key environmental interactions. Identification and Assessment of Impacts. Establishment of protective and corrective measures. Environmental monitoring program. Document of Synthesis.



4. TOPIC 4. ENVIRONMENTAL INVENTORY IN AN ENVIRONMENTAL IMPACT STUDY. (SECTION II. CONTENTS OF AN ENVIRONMENTAL IMPACT STUDY)

Aspects that affect the environmental inventory. Definition of environmental units: methods and techniques for the preparation of environmental mapping. Choice of variables. Sources of information. Storage and processing of information.

5. TOPIC 5. INDICATORS FOR ENVIRONMENTAL IMPACT ASSESSMENT. (SECTION II. CONTENTS OF AN ENVIRONMENTAL IMPACT STUDY)

Usefulness of indicators for the EIA. Scientific requirements of the indicators. Selecting a minimum set of indicators. Units of expression of the indicators. Organization of the indicators. Indicators for sustainability: scientific requirements. Indicators and spatial and temporal variability of natural resources. Methods for the integration of indicators.

6. TOPIC 6. ANALYSIS AND ASSESSMENT OF QUALITY AND VULNERABILITY OF NATURAL RESOURCES. (SECTION II. CONTENTS OF AN ENVIRONMENTAL IMPACT STUDY)

Quality and vulnerability of natural resources as a basis for assessing environmental impacts. Functions of natural resources and quality assessment. Environmental processes and vulnerability assessment of natural resources. Examples of quality and vulnerability assessment of natural resources.

7. TOPIC 7. METHODS AND TECHNIQUES FOR IDENTIFICATION AND EVALUATION OF ENVIRONMENTAL IMPACTS (I). (SECTION III. METHODS AND TECHNIQUES FOR IDENTIFICATION, EVALUATION AND INTEGRATION OF ENVIRONMENTAL IMPACTS)

Ad hoc methods: expert opinion. Checklists. Matrices. Map overlay, spatial analysis. Advantages and disadvantages.

8. TOPIC 8. METHODS AND TECHNIQUES FOR IDENTIFICATION AND EVALUATION OF ENVIRONMENTAL IMPACTS (II). (SECTION III. METHODS AND TECHNIQUES FOR IDENTIFICATION, EVALUATION AND INTEGRATION OF ENVIRONMENTAL IMPACTS)

Networks or schemes cause and effect. Simulation models. Methods based on quality functions. Advantages and disadvantages

9. TOPIC 9. METHODS AND TECHNIQUES FOR IDENTIFICATION AND EVALUATION OF ENVIRONMENTAL IMPACTS (III). (SECTION III. METHODS AND TECHNIQUES FOR IDENTIFICATION, EVALUATION AND INTEGRATION OF ENVIRONMENTAL IMPACTS)



Limitations in the assessment of impacts: EIA uncertainty. Methods and techniques for uncertainty analysis: comparison scenarios, scenario analysis and sensitivity analysis.

10. TOPIC 10. METHODS AND TECHNIQUES FOR THE AGGREGATION OF ENVIRONMENTAL IMPACTS: ASSESSMENT AND COMPARISON OF ALTERNATIVES. (SECTION III. METHODS AND TECHNIQUES FOR IDENTIFICATION, EVALUATION AND INTEGRATION OF ENVIRONMENTAL IMPACTS)

Methods of aggregation of impacts: rating-weighting. Technical advisory panels of experts: the Delphi Method. Methods based on diagnostic units: sensitivity analysis. Evaluation and comparison of alternatives multi criteria methods and techniques.

11. TOPIC 11. LA PARTICIPACIÓN PÚBLICA EN LA EVALUACIÓN DE IMPACTO AMBIENTAL. (SECTION III. METHODS AND TECHNIQUES FOR IDENTIFICATION, EVALUATION AND INTEGRATION OF ENVIRONMENTAL IMPACTS)

Importance of public participation in EIA: value judgments and multiple preferences. Mechanisms for public participation in EIA legislation. Approaches to encourage public participation. Procedures to facilitate conflict resolution.

12. TOPIC 12. ESTABLISHMENT OF PROTECTIVE AND CORRECTIVE MEASURES: ENVIRONMENTAL MONITORING PROGRAM. (SECTION IV. PROGRAM OF ENVIRONMENTAL MONITORING)

Measures on the actions of the project. Measures for significant impacts. Measures on the location of actions. Environmental monitoring program: the importance of monitoring the impacts. Monitoring indicators.

13. TOPIC 13. ENVIRONMENTAL ASSESSMENT OF POLICIES, PLANS AND PROGRAMS: INTRODUCTION TO STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA). (SECTION V. INTRODUCTION TO STRATEGIC ENVIRONMENTAL ASSESSMENT)

Importance and justification of Strategic Environmental Assessment (SEA). SEA and EIA as tools for sequential assessment of the territory. Status of SEA in the European Union. Status of SEA in Spain: perspectives.

**WORKLOAD**

ACTIVITY	Hours	% To be attended
Theory classes	54,00	100
Computer classroom practice	14,00	100
Classroom practices	12,00	100
Laboratory practices	5,00	100
Tutorials	5,00	100
Study and independent work	15,00	0
Readings supplementary material	10,00	0
Preparation of evaluation activities	40,00	0
Preparing lectures	28,00	0
Preparation of practical classes and problem	42,00	0
TOTAL	225,00	

TEACHING METHODOLOGY

The development of the course is structured into sessions of theory, practice session (problems) in 2 hours, practice session (computer) for 2 hours, a field trip of 5 hours, mentoring and presentation of work for 20 minutes in a workshop session.

In the **lectures**, the student will receive an overview of the topic by the teacher, who focuses on those key concepts for understanding it. The student will have to be previously prepared material to be worked in class, so there is this active participation in the development of it, by raising issues, the proposal examples, discussion of concepts, and so on. The teacher will tell students the material and resources best suited to study the topic in depth.

In **tutorials**, students will be guided by the teacher on all elements of the learning process, both issues of theoretical and practical. Tutorials are conducted to help resolve issues, problems, and also to direct work to prepare for them, both in relation to the development of Practices Reports and in the preparation of work to exhibit at the sessions seminars.

In the **seminar sessions** each group of students will make an oral presentation of work to the whole class, dealing with a case study published in a scientific paper or an environmental impact study handled in a public administration. The objective of doing these seminars is to motivate students in research activities, as well as in analysis and evaluation of information. In addition, also to promote increasing interactions between students for teamwork, so as to encourage the coordination and synergy in the development and resolution of problems, issues of great importance to address an Environmental Impact Study.

In **practical classes**, both computer and problems, and also in the field trip, which is joint with the subject of Environmental Restoration and Rehabilitation, students will have to solve a problem posed by the teacher about the program content. The team will work through the formation of student groups, in order to encourage interaction among students, coordination of teamwork and synergy in tackling and solving problems.



INTERNSHIP PROGRAM (COMPUTER, PROBLEMS AND FIELD).

- Analysis and evaluation of environmental impacts on various natural resources, based on quality and vulnerability.
- Application of methods and techniques for the identification, characterization and assessment of environmental impacts.
- Application of methods and techniques of integration of environmental impacts and of evaluation of alternatives.

PRACTICE PROBLEMS. Application of methods and techniques for the identification, characterization and assessment of environmental impacts.

Management methods and techniques of integration of environmental impacts and evaluating alternatives.

6 sessions x 2 hours

COMPUTER LAB. Analysis and evaluation of environmental impacts on various natural resources, based on quality and vulnerability, through procedures and methodologies in computerized form.

7 sessions x 2 hours

FIELD. Identification and assessment of environmental impacts on representative areas of the Mediterranean area.

1 session x 5 hours

EVALUATION

During the development of the subject, both theoretical and practical classes, there will be an ongoing evaluation of the attitude, interest and progress made by the student.

In the Memories of Practices (Problems, Computer and Field), students should reflect the procedure for solving the problem, discussing the advantages and disadvantages of the methods and techniques applied, presenting and discussing the results in accordance with the objectives and commenting conclusions. These memories, which must be submitted to the exam, can influence the final grade up to 20%. Attendance at practical classes is compulsory.

The exhibition of work in workshop sessions may be up to 10% of the final grade.



There will be a final written exam will include multiple choice questions 40-50 (type test), of which the right will be the most accurate, and 5-6 questions or problems concerning the program contents, which may be both from the theoretical module as from practical. To pass the exam any student must get a 5 or more in the multiple choice test, accounting for 60% of the exam, and get a 5 or more in the questions or problems part, representing 40% of the note examination. The grade of the exam will account for the 70% of the final grade.

To pass the course, a student must obtain a score greater than or equal to 5 (ranged to 10) in the final written exam. Passed the examination, it will be accounted the% corresponding to the on-going assessment, to the practice reports and the statement of work in the seminar, in order to get a weighted final grade.

The student must complete the compulsory activities before to apply for the advancement of the exam.

REFERENCES

Basic

- CANTER, L.W. (1998). Manual de Evaluación de Impacto Ambiental. Técnicas para la Elaboración de Estudios de Impacto. Mc Graw-Hill. Madrid.
- CONESA FERNÁNDEZ-VITORA, V. (2010). Guía Metodológica para la Evaluación de Impacto Ambiental. 4ª Edición. Ed. Mundi-Prensa. Madrid.
- GARMENDIA, A., SALVADOR, A., CRESPO, C. Y GARMENDIA, L. (2007). Evaluación de Impacto Ambiental. Ed. Pearson-Prentice Hall. Madrid.
- GOMEZ OREA, D, GOMEZ VILLARINO, MT (2013). Evaluación del Impacto Ambiental.Tercera Edición. Ed. Mundi-Prensa. Madrid.
- GOMEZ OREA, D. (2007). Evaluación Ambients Estratégica. Ed. Mundi-Prensa. Madrid.
- OÑATE, J.J., PEREIRA, D., SUAREZ, F., RODRÍGUEZ, J.J. Y CHACON, J. (2002). Evaluación Ambiental Estratégica: la evaluación ambiental de Políticas, Planes y Programas. Ed. Mundi-Prensa. Madrid.
- RECATALÁ, L. (1995). Propuesta metodológica para Planificación de los usos del territorio y Evaluación de Impacto Ambiental en el ámbito Mediterráneo Valenciano. Tesis Doctoral. Universitat de València. Servei de Publicacions de la Universitat de València.
- WESTMAN, W.E. (1985). Ecology, Impact Assessment and Environmental Planning. John Wiley & Sons. New York.

Additional

- Papers in specialized scientific journals: Environmental Impact Assessment Review, Journal of Environmental Mngement, Environmental Management, Soil Use and Management, etc.