250662 - SISEINGAMB - Systems and Tools of Environmental Management

**Coordinating unit:** 250 - ETSECCPB - Barcelona School of Civil Engineering  
**Teaching unit:** 758 - EPC - Department of Project and Construction Engineering  
**Academic year:** 2019  
**Degree:** MASTER'S DEGREE IN ENVIRONMENTAL ENGINEERING (Syllabus 2014). (Teaching unit Compulsory)  
**ECTS credits:** 5  
**Teaching languages:** Spanish

**Teaching staff**

**Coordinator:** SANTIAGO GASSO DOMINGO  
**Others:** SANTIAGO GASSO DOMINGO, MARIA GONÇALVES AGEITOS, VICTOR LOPEZ GRIMAU

**Opening hours**

**Timetable:** The student consultant service takes place both during the intervals between classes and through personal email or agreed hours.

**Degree competences to which the subject contributes**

**Specific:**
- 13340. Apply scientific concepts to environmental problems and their correlation with technological concepts.
- 13343. Identify, define and propose technological management and appropriate solution to an environmental problem.
- 13345. Ask practically, with an economic perspective and according to the applicable environmental legislation, environmental management tools and environmental risk assessment.
- 13346. Plan and schedule projects according to parameters cross-project evaluation, develop and organize their basic documentation and analyze technical and economic viability.

**Transversal:**
- 8558. ENTREPRENEURSHIP AND INNOVATION: Being aware of and understanding how companies are organised and the principles that govern their activity, and being able to understand employment regulations and the relationships between planning, industrial and commercial strategies, quality and profit.
- 8560. SUSTAINABILITY AND SOCIAL COMMITMENT: Being aware of and understanding the complexity of the economic and social phenomena typical of a welfare society, and being able to relate social welfare to globalisation and sustainability and to use technique, technology, economics and sustainability in a balanced and compatible manner.
- 8561. TEAMWORK: Being able to work in an interdisciplinary team, whether as a member or as a leader, with the aim of contributing to projects pragmatically and responsibly and making commitments in view of the resources that are available.
- 8562. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.
- 8563. FOREIGN LANGUAGE: Achieving a level of spoken and written proficiency in a foreign language, preferably English, that meets the needs of the profession and the labour market.
Teaching methodology

The course consists of 3 hours per week of classroom activity.

These hours will be devoted to the presentation by the teacher of the basic concepts and materials of the subject. Also, examples are presented and students will have to perform practical exercises in order to consolidate the general and specific learning objectives.

It is expected that some classroom sessions will be devoted to the approach, discussion and analysis of case studies related to the subject contents.

Support material in the form of a detailed teaching plan is provided using the virtual campus ATENEA: content, program of learning and assessment activities conducted and literature.

Learning objectives of the subject

CE01 - Apply scientific concepts to environmental problems and their correlation with technological concepts.
CE04 - Identify, define and propose technological management and appropriate solution to an environmental problem.
CE06 - Ask practically, with an economic perspective and according to the applicable environmental legislation, environmental management tools and environmental risk assessment.
CE07 - Plan and schedule projects according to parameters cross-project evaluation, develop and organize their basic documentation and analyze technical and economic viability.

Understand the context in which they have developed environmental policies.
Meet environmental legislative framework and the main regulations that develop it.
Analyzes the economic factors associated with environmental management.
Understands the concepts and actions resulting from the prevention and control of pollution.
Know the main elements associated with environmental management.
Apply environmental management tools.
Tools known environmental risk analysis for human health and ecosystems.
Meet the analysis tools lifecycle and sustainability, and its practical application.
Solidify the main knowledge that characterize and define the project methodologies and their application to the field of Environmental Engineering.
Acquire knowledge and skills to manage environmental projects, evaluating alternatives and making decisions about their viability.
Definition applies methods and project management in the development of an environmental project (case study).
Learn in a practical way the dynamics of multidisciplinary teamwork.

Factors of environmental management members.
Integrated Prevention and Pollution Control (IPPC):
- Concept and implications of the IPPC.
- Legal framework of IPPC.
- Limit values.
- Cleaner Production.
- Best available technology.
Strategic Environmental Assessment:
- Administrative procedure of EAE.
- Legal framework.
Indirect and cumulative impacts.
Environmental sustainability report.
Relationship with the environmental impact assessment of projects. Environmental Impact Assessment:
- Introduction to the concept of EIA.
- Administrative procedure of EIA. Legal framework.
Environmental impact study.
Project Description: Alternative, emissions inventory, technologies, etc..
Analysis of the receiving environment.
Identification, description, characterization and evaluation of impacts.
Remedial measures.
Environmental Monitoring Plan.
Environmental impact statement.

Environmental Audits:
Environmental Management Systems, ISO14001 and EMAS.
Elements of an environmental management system.
Identification of the environmental aspects.
Objectives and goals in a SGA.
Environmental program, implementation, control and monitoring of the SGA.
Environmental Communication.
Environmental risk on human health and ecosystems.

Study load

<table>
<thead>
<tr>
<th>Total learning time: 125h</th>
<th>Theory classes: 15h</th>
<th>12.00%</th>
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</thead>
<tbody>
<tr>
<td>Practical classes:</td>
<td>10h</td>
<td>8.00%</td>
</tr>
<tr>
<td>Laboratory classes:</td>
<td>10h</td>
<td>8.00%</td>
</tr>
<tr>
<td>Guided activities:</td>
<td>10h</td>
<td>8.00%</td>
</tr>
<tr>
<td>Self study:</td>
<td>80h</td>
<td>64.00%</td>
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## 250662 - SISEINGAMB - Systems and Tools of Environmental Management

### Content

<table>
<thead>
<tr>
<th>Introduction and framework development of systems development and environmental management tools</th>
<th>Learning time: 7h 11m</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 1h</td>
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<tr>
<td></td>
<td>Practical classes: 1h</td>
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<tr>
<td></td>
<td>Laboratory classes: 1h</td>
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<td>Self study: 4h 11m</td>
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**Description:**
Introduction to fundamentals and concepts related to the tools and environmental management systems. Analysis of the framework for the development of environmental management systems (UN conference proceedings and the Environment Action Programmes of EU, etc.).

**Specific objectives:**
- Know and understand the connection between environmental policy and environmental management instruments as tools to advance towards sustainable development
- Analyze the changes in the conception and operation of production systems and the need to integrate the environmental component in these systems

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<thead>
<tr>
<th>Environmental Assessment</th>
<th>Learning time: 28h 47m</th>
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<tbody>
<tr>
<td></td>
<td>Theory classes: 5h</td>
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<tr>
<td></td>
<td>Practical classes: 4h</td>
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<td></td>
<td>Laboratory classes: 3h</td>
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<td>Self study: 16h 47m</td>
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**Description:**
Incorporation into the decision making process of the environmental component. Approaches. Plans, programs and projects. Concepts.

**Strategic Environmental Assessment (SEA).** Concept. Legislative framework. Content development and environmental sustainability report.


**Specific objectives:**
- Understand the concepts and procedures of SEA and EIA
- Describe the incorporation of SEA and EIA in the decision making process on the feasibility of policies, plans, programs and projects
- Identify the characteristics of the main developed methodologies for conducting the SEA and EIA
### Environmental management audit systems

**Learning time:** 16h 48m  
- Theory classes: 4h  
- Practical classes: 2h  
- Laboratory classes: 1h  
- Self study: 9h 48m

**Description:**  
Introduction: Basic concepts. Comparisons between environmental management audit system. Advantages and limitations of these systems.

Steps for the implementation and operation: Definition, Planning, Implementation, Operation, Verification.

**Specific objectives:**  
- Understand and characterize the elements that integrate environmental management audit systems considering both framework the EU (EMAS) and the International System (ISO 14001).
- Know how to define and describe the steps needed for planning, implementation and operation of an environmental management audit system.

### Integrated Pollution Prevention and Control

**Learning time:** 12h  
- Theory classes: 2h  
- Practical classes: 2h  
- Laboratory classes: 1h  
- Self study: 7h

**Description:**  

**Specific objectives:**  
- Understand the concept of comprehensive prevention and control of pollution, and the context associated with its development and implementation.
- Be able to analyze the impact on environmental management of production processes and their relationship to the concepts of best available technology, minimization and cleaner production.
Environmental Communication

<table>
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<tr>
<th>Description:</th>
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<tbody>
<tr>
<td>Introduction to the principles, the strategies and the technical means used in the practice of environmental communication in the most diverse fields applicable, both in business and in public authorities.</td>
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<thead>
<tr>
<th>Specific objectives:</th>
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<tbody>
<tr>
<td>- Know the basis of Environmental communication;</td>
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<td>- Know the techniques for focusing a technical report on environmental issues and their presentation in public;</td>
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<tr>
<td>- Know what a strategy and a Environmental communication plan are;</td>
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<td>- Be familiar with the techniques of Environmental communication in business and public administrations.</td>
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<th>Learning time:</th>
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<tr>
<td>7h 11m</td>
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Environmental risk to human health and ecosystems

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<th>Description:</th>
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<tr>
<td>Introduction to basic methods applied in the analysis of risks to human health and ecosystems, and the approach of the basic assumptions in this risk analysis is based.</td>
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<table>
<thead>
<tr>
<th>Specific objectives:</th>
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<tbody>
<tr>
<td>- Recognise the main aspects related to the identification and characterization of environmental risk receptors</td>
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<tr>
<td>- Be familiar with the methodologies of risk analysis: human health and ecosystems</td>
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<tr>
<td>- Understand the limiting elements of risk analysis</td>
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<tr>
<td>- Know how to present the results derived from the risk analysis</td>
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<table>
<thead>
<tr>
<th>Learning time:</th>
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<tbody>
<tr>
<td>12h</td>
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Qualification system

The evaluation of the course consists of three parts that must be overcome (overcoming evidence indicates sufficiency obtain a minimum of 3 on a scale of 10) all separately. The weighting of each part of the note is as follows: Final theory exam (45%), course work (35%), preparation and oral presentation of work (20%).
Regulations for carrying out activities

Failure to perform a laboratory or continuous assessment activity in the scheduled period will result in a mark of zero in that activity.

To be evaluated a minimum class attendance of 70% is considered necessary.

To pass the course you must have exposed orally delivered and all work requested during the course.

Bibliography

Basic:


