Course guide
220560 - 220560 - Environmental and Energy Management

Last modified: 04/07/2023

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 758 - EPC - Department of Project and Construction Engineering.

Degree: MASTER'S DEGREE IN MANAGEMENT ENGINEERING (Syllabus 2012). (Compulsory subject).

Academic year: 2023 **ECTS Credits:** 5.0 **Languages:** Catalan

LECTURER

Coordinating lecturer: Lopez Grimau, Victor
Gangolells Solanellas, Marta

Others: Lopez Grimau, Victor
Gangolells Solanellas, Marta

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. To analyze the risks and consequences of proposed solutions in the various organizational sub-systems and their social and environmental contexts.
2. Apply theories and inherent principles in the production and logistics area in order to analyze uncertainty complex situations and make decisions using engineering tools.
3. Plan, organize, implement, lead and manage engineering projects, especially projects of innovation (R + D + I) and process improvement.

Generical:
4. Ability to apply knowledge to solve problems in new environments or unfamiliar environments within broader contexts (or multidisciplinary) related to engineering.
5. Self-learning capacity to independent continuous training.
6. Ability to effectively communicate their findings, knowledge and concluding reasons to skilled and unskilled audiences, clearly and unambiguously.
7. Ability to integrate knowledge and formulate judgments with the aim of making decisions based on information that, with incomplete or limited include reflecting on social and ethical responsibilities linked to the application of their knowledge and judgments.
8. Ability to understand the impact of engineering solutions in a global and social context .
9. Ability to operate and lead multidisciplinary and multicultural groups, with negotiation skills, group work, relationships in an international setting, and conflict resolution.

TEACHING METHODOLOGY

The course is divided into three parts:

- Theory classes.
- Practical classes.
- Self-study for doing exercises and activities..

In the theory classes, teachers will introduce the theoretical basis of the concepts, methods and results and illustrate them with examples appropriate to facilitate their understanding.

In the practical classes (in the classroom), teachers guide students in applying theoretical concepts to solve problems, always using critical reasoning. We propose that students solve exercises in and outside the classroom, to promote contact and use the basic tools needed to solve problems.

Students, independently, need to work on the materials provided by teachers and the outcomes of the sessions of exercises/problems, in order to fix and assimilate the concepts. The teachers provide the curriculum and monitoring of activities (by ATENEA).

LEARNING OBJECTIVES OF THE SUBJECT

The aim of this subject is to provide basic knowledge on the interrelation between industrial activities and the environment. The importance of the various existing instruments for the integrated prevention and control of the pollution will be stressed, going deep into both legal and regulation issues which may affect industrial facilities. Taking into account the special relation between environment and energy, the subject will focus mainly on energy management aspects within the company.

STUDY LOAD

Type	Hours	Percentage
Hours medium group	15,0	12.00
Guided activities	22,0	17.60
Hours large group	8,0	6.40
Self study	80,0	64.00

Total learning time: 125 h

CONTENTS

Module 1: Introduction to environmental problematics

Description:
Introduction and historical referents.
Concept and sustainability indicators.
Main environmental issues.

Full-or-part-time: 12h 15m
Theory classes: 1h
Practical classes: 1h 15m
Self study : 10h

Module 2: Life Cycle Assessment

Description:
Concept
Legal framework
Methodology

Full-or-part-time: 17h 15m
Theory classes: 1h
Practical classes: 2h 15m
Guided activities: 4h
Self study : 10h

Module 3: Prevention and control of activities

Description:
Directive concerning industrial emissions, Best Available Techniques (BATs), Emission Limit Values and BAT Reference Documents (BREFs).
Law on pollution prevention and control of activities, classification of activities and administrative intervention regime.

Full-or-part-time: 30h 30m
Theory classes: 2h
Practical classes: 4h 30m
Guided activities: 8h
Self study : 16h

Module 4: Environmental Management Systems in companies

Description:
Introduction to Environmental Management Systems.
Legal framework for Environmental Management Systems.
Environmental Management System implementation process.
Environmental Management System audits and system verification/certification.
Environmental communication and information.
Integrated Management Systems.

Full-or-part-time: 17h 18m
Theory classes: 1h
Practical classes: 2h 18m
Guided activities: 4h
Self study : 10h

Module 5: Energy audits

Description:
Legal framework
Methodology
Audit planning
Analysis of the energy consumption
Energy saving measures
Economic analysis of energy saving opportunities

Full-or-part-time: 47h 30m
Theory classes: 3h
Practical classes: 4h 30m
Guided activities: 6h
Self study : 34h

GRADING SYSTEM

The final course grade depends on the following evaluation evidences:

- Cases, weigh: 20%
- Final theory exam, weigh: 40%
- Project, weigh: 40%

Non-satisfactory results in the theoretical exam will be able to be redirected by means of a written test that will take place the day of the final exam. This reset exam will cover, in any case, concepts related to theory of the subject. All the students can take this exam. Marks in the reset exam can range from 0 to 10. Only the best mark will be taken into account.

BIBLIOGRAPHY

Basic:
- Thumann, A.; Younger, W.J.; Niehus, T. Handbook of energy audits. 8th ed. Lilburn: Fairmont Press, 2009. ISBN 9781439821459.

Complementary:
- European Commission. EU Eco-Management and Audit Scheme (EMAS) [on line]. [Consultation: 17/06/2022]. Available on: http://ec.europa.eu/environment/emas/.
- UNE-EN ISO 14001:2015. Sistemas de gestión ambiental: requisitos con orientación para su uso. AENOR, 2015.
- Rey, F.J.; Velasco, E. Eficiencia energética en edificios: certificación y auditorías energéticas. Madrid: Thompson, 2006. ISBN 8497324196.

RESOURCES

Hyperlink:
- http://territori.gencat.cat/ca/inici/