Course guide
33115 - GTR - Waste Management and Treatment

Last modified: 06/06/2024

Unit in charge: Manresa School of Engineering
Teaching unit: 750 - EMIT - Department of Mining, Industrial and ICT Engineering.

Degree: MASTER'S DEGREE IN NATURAL RESOURCE ENGINEERING (Syllabus 2015). (Compulsory subject).

Academic year: 2024 **ECTS Credits:** 5.0 **Languages:** Spanish

LECTURER

Coordinating lecturer: Guimerà Villalba, Xavier

Others: Altres

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
1. The ability to understand the types of waste that may be generated from natural resources and apply the most appropriate approaches to management and treatment.

TEACHING METHODOLOGY

Teaching methodology (face-to-face modality): In this module, students will participate in in-person classes where the course content will be presented. Through research activities, students will apply the concepts learned in a practical context. Additionally, autonomous learning will be promoted through the resolution of practical case studies. The achievement of the learning objectives of the course will be assessed in 2 specific exams for each module of the course.

Teaching methodology (non-face-to-face modality): In this online course, the content will be presented through study materials accessible online. Students will work on the content through practical activities, reading articles, and solving proposed problems. Autonomous learning will be encouraged with self-assessment tasks and guided research activities. The achievement of the learning objectives of the course will be assessed in 1 exam.

LEARNING OBJECTIVES OF THE SUBJECT

OG1: Comprender los elementos que conforman un marco normativo en materia de gestión de residuos
OG2: Descubrir los procedimientos para la caracterización de un residuo
OG3: Identificar las partes de un modelo de gestión de residuos
OG4: Conocer los principales sistemas de tratamiento de residuos
OG5: Conocer el origen y tratamiento de los residuos no peligrosos
OG6: Conocer el origen y tratamiento de los residuos peligrosos

STUDY LOAD

Type	Hours	Percentage
Hours medium group	15,0	33.33
Hours large group	30,0	66.67

Total learning time: 45 h

CONTENTS

Module 1

Description:
Unit 1. Regulatory framework for waste management
Unit 2. Characterization of industrial waste
Unit 3. Management of industrial waste

Specific objectives:
OE1: Discover the regulatory framework for waste management specific to a geographic area
OE2: Distinguish the elements of a waste prevention and management policy
OE3: Use the available waste management tools

OE4: Identify the different phases of the waste characterization process
OE5: Understand the different parameters for characterizing waste
OE6: Relate characterization parameters to analytical methods
OE7: Categorize industrial waste based on its hazardousness
OE8: Identify the different actors in a waste management model
OE9: Apply available tools for minimizing special waste
OE10: Use the available tools for waste reuse

Related activities:
- Theoretical classes.
- Problem formulation and resolution in class.
- Independent study and work by the student.
- Individualized student follow-up and assessment.
Q1, Q2, Q3
P2, P3
C1, C2, C3
Exam 1

Full-or-part-time: 62h 30m
Theory classes: 22h 30m
Self study : 40h

Module 2

Description:
Unit 4. Industrial Waste Treatment Systems
Unit 5. Treatment of Non-Hazardous Industrial Waste
Unit 6. Treatment of Hazardous Industrial Waste

Specific objectives:
OE11: Distinguish the processes for treating solid, liquid, and gaseous waste
OE12: Differentiate between physical and chemical treatment processes
OE13: Identify technologies for the treatment of non-hazardous waste
OE14: Demonstrate the ability to select appropriate technology for non-hazardous waste
OE15: Identify technologies for the treatment of hazardous waste
OE16: Demonstrate the ability to select appropriate treatment technology for hazardous waste

Related activities:
- Theoretical classes.
- Problem formulation and resolution in class.
- Independent study and work by the student.
- Individualized student follow-up and assessment.
Q4, Q5, Q6
P4, P5, P6
C4, C5, C6

Full-or-part-time: 62h 30m
Theory classes: 22h 30m
Self study : 40h

GRADING SYSTEM

Face-to-face modality:
Course grade = Research activities (20%) + Case studies (20%) + Exam 1 (30%) + Exam 2 (30%)

Non-face-to-face modality:
Course grade = Questionnaires (20%) + Research activities (20%) + Problem-solving (20%) + Exam (40%)

BIBLIOGRAPHY

Basic:
- Aguado Alonso, José, i altres. Los residuos peligrosos: caracterización, tratamiento y gestión. Madrid: Síntesis, 1999. ISBN 8477387036.
- Elías Castells, Xavier, dir. Tratamiento y valorización energética de residuos. Madrid: Díaz de Santos, 2005. ISBN 8479786949.
- Gil, Manel, i altres. De residu a recurs: 20 anys de gestió de residus a Catalunya. Barcelona: Clipmèdia Edicions. Generalitat de Catalunya, Departament de Territori i Sostenibilitat: Agència de Residus de Catalunya, 2013. ISBN 9788494184000.
- Lagrega, Michael D.; Buckingham, Phillip L.; Evans, Jeffrey C. Gestión de residuos tóxicos: tratamiento, eliminación y recuperación de suelos. Madrid: McGraw-Hill, 1996. ISBN 8448107128.
- Panorama minero [on line]. Madrid: Instituto Geológico y Minero de España, 1981- [Consultation: 12/11/2020]. Available on: http://www.igme.es/panoramaminero/pmlin.htm.- Pérez Dueñas, Lara, i altres. Guía de caracterización de residuos peligrosos. Bilbao: Atregus, 2008. ISBN 9788461229628.
- Tchobanoglous, George; Theisen, Hilary; Vigil, Samuel. Gestión integral de residuos sólidos. Madrid: McGraw Hill, 1994. ISBN 8448118308.