SUBJECT TEACHING GUIDE

G718 - Management and Industrial Ecology

Degree in Industrial Technologies Engineering

Academic year 2023-2024

1. IDENTIFYING DATA					
Degree	Degree in Industrial Technologies Engineering			Type and Year	Optional. Year 4
Faculty	School of Industrial Engineering and Telecommunications				
Discipline	Subject Area: Management and Industrial Organisation Optional Module				
Course unit title and code	G718 - Management and Industrial Ecology				
Number of ECTS credits allocated	6	Term		Semester based (2)	
Web					
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. TRANSPORTES Y TECNOLOGIA DE PROYECTOS Y PROCESOS
Name of lecturer	MARIA DEL CARMEN RUIZ PUENTE
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Other lecturers	

3.1 LEARNING OUTCOMES

- To adopt a new model of leadership and engineering based on Industrial Ecology principles.
To embed the life cycle and circular thinking in the design stages of projects and products.
Being able to model a complex problem of sustainable design and systems innovation.
To apply the strategies, methods and tools in which the transition towards a circular economy is supported.
To develop the critical skills to analyze different case studies.

4. OBJECTIVES

To know the Industrial Ecology theory as the main framework of industrial sustainability .
To identify the indicators and elements of sustainability within the industrial activity .
To analyse the main policies and environmental management systems in the companies .
To know and apply the industrial ecology principles to industrial systems design .
To know and apply the techniques and tools to assess the sustainability .
To identify new projects and business opportunities based on closing the loops across the entire industrial system .

6. COURSE ORGANIZATION

CONTENTS	
1	Sustainability and industrial ecology. Concept of sustainable development and millennial goals. Agents involved. Industrial ecology and other approaches. Systemic thinking. Biological ecology versus Industrial ecology. Technological change. Risk management. Case studies.
2	Methods and tools for Industrial Ecology. Systems-based: Life cycle assessment, Analysis of material flows. Environmental Input-Output Analysis. Complex systems-based: Sytem Dynamics, Agent Based, Network Modeling. Key Eco-Efficiency Indicators. Case studies.
3	Industrial ecology and circular economy. Situation and policies within Europe and worldwide. Foundations and strategies for a circular economy. Sustainable design for the circularity. Functional economy and new business models based on value and values. Industrial Symbiosis and Urban Industrial eco-systems. Case studies.
4	Laboratory for the transition towards a sustainable circular economy: methods and tools to understand and experiment with the step change and new models. Facilitation tools, Simulation tools, Planning tools.

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Written exam 60%	Written exam	No	Yes	70,00
Lab deliverables 40%	Work	No	Yes	30,00
TOTAL				100,00

Observations

In case of sanitary alert due to COVID-19, the assessment of the subject will be equally done on-line.

Observations for part-time students

The part-time students can be tested of the complete course syllabus by a written exam on the official calls.

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

Azapagic et al. Sustainable Development in Practice: Case Studies for Engineers and Scientists. Adisa Azapagic , Slobodan Perdan, Roland Clift Eds: Wiley; 2004.
Ayres RU and Ayres LW. A Handbook of Industrial Ecology. Massachusetts: Edward Elgar Publishing Lt; 2002.
Graedel TE and Allenby BR. Industrial Ecology and Sustainable Engineering. Pearson; 2009.
Halliday S. Sustainable Construction. Oxford: Butterworth-Heinemann, 2008.