

SUBJECT TEACHING GUIDE

G775 - Industrial and Environmental Sustainability

Degree in Chemical Engineering

Academic year 2022-2023

1. IDENTIFYING DATA				
Degree	Degree in Chemical Engineering		Type and Year	Compulsory. Year 3
Faculty	School of Industrial Engineering and Telecommunications			
Discipline	Subject Area: Industrial Environmental Sustainability, Project Organisation and Management, and Technical Department Module: Compulsory Training in Common with the Industrial Branch			
Course unit title and code	G775 - Industrial and Environmental Sustainability			
Number of ECTS credits allocated	6	Term	Semester based (1)	
Web	https://campusvirtual.unican.es/Profesor/ProfesorGrado/GuiaDocenteFw.aspx			
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery Face-to-face

Department	DPTO. INGENIERIAS QUIMICA Y BIOMOLECULAR
Name of lecturer	JOSE ANGEL IRABIEN GULIAS
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Other lecturers	MARIA MARGALLO BLANCO LUCIA GOMEZ COMA JAVIER FERNANDEZ GONZALEZ

3.1 LEARNING OUTCOMES

- Historical development of the Sustainable Development. From the XX century fundamentals to the XXI transicion
- Competences to identify the fundamentals of sustainability of the processes and products and the ecosystem services
- Assessment of the sustainability in the use of natural resources and the control of the environmental burdens in processes and products
- Assessment of the environmental burdens and sustainability indicators in processes and products
- Management of the environmental burdens to the atmosphere
- Management of the environmental burdens to the aquatic environment
- Main factors in waste management
- Main techniques in environmental management
- Application of the environmental sustainability concept to case of study: BREF document and Integrated Prevention and Pollution Control

4. OBJECTIVES

- Relationship between environment and production and services
- Assessment of the relationship between environment and production and services
- Control of the consequences to the environment of the production and services activities
- Understand the concept "Sustainable Development" and the boundary limits

6. COURSE ORGANIZATION	
CONTENTS	
1	<p>PART 1. INTRODUCTION TO THE SUSTAINABILITY</p> <p>1.1. The Human Development in the XX Century and the Sustainable Development in the XXI Century. The Ecosystem Services</p> <p>1.2. The Sustainable Development Goals (SDG)</p> <p>1.3 Enterprise, Human Resources and the Transition to the Sustainability.</p> <p>CASES OF STUDY</p>
2	<p>PART 2. SUSTAINABLE MANAGEMENT OF NATURAL RESOURCES</p> <p>2.1. Energy: Renewable and Non-Renewable Resources</p> <p>2.2. Water and the Nexus</p> <p>2.3 Materials</p> <p>2.4 The Circular Economy</p> <p>CASES OF STUDY</p>
3	<p>PART 3. IDENTIFICATION AND ASSESSMENT OF ENVIRONMENTAL BURDENS</p> <p>3.1. Global Change. The limits of the planet</p> <p>3.2. Environmental burdens with local impact</p> <p>CASES OF STUDY</p>
4	<p>PART 4: ENVIRONMENTAL TECHNOLOGIES</p> <p>4.1. Control of emissions to the atmosphere</p> <p>4.2. Control of water quality and effluents</p> <p>4.3. Waste Management</p> <p>4.4 Water pollution: release and regulation</p> <p>4.5. Waste management: identification and treatments</p> <p>CASES OF STUDY</p>
5	<p>PART 5. ENVIRONMENTAL MANAGEMENT OF ACTIVITIES AND SERVICES</p> <p>5.1. Environmental Impact Assessment</p> <p>5.2 Environmental Management and Audit Systems</p> <p>5.3 Life Cycle assessment</p> <p>5.4 Chemical Hazards</p>

7. ASSESSMENT METHODS AND CRITERIA				
Description	Type	Final Eval.	Reassessn	%
Continuous Tests on practical and theoretical concepts in the classroom	Written exam	Yes	Yes	30,00
Developed activities and presentation	Written exam	Yes	Yes	30,00
Presentation in ppt including audio	Work	No	No	20,00
Participation and interest in the course taking into account the developed work	Others	No	No	20,00
TOTAL				100,00
Observations				
Ongoing evaluation will be considered only for those student that deliver on time all the activities				
Observations for part-time students				
Partial time students may follow the theory and practical work separately				

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

DT Allen, DR Shonnard, Sustainable Engineering. Concepts, Design and Case Studies PH-PTR (2012)

DT Allen, DR Shonnard, Green Engineering "Environmentally conscious design of chemical processes" . PH-PTR (2002)

Environmental engineering / Howard S. Peavy, Donald R. Rowe, George Tchobanoglous. Editorial: New York ; Madrid [etc.] : McGraw-Hill, 1985. Colección: McGraw-Hill series in water resources and environmental engineering ISBN: 0-07-049134-8