



Teaching Guide

Identifying Data					2022/23
Subject (*)	Cogeneration and Biomass Systems		Code	730547003	
Study programme	Máster Universitario en Eficiencia Enerxética e Sustentabilidade				
Descriptors					
Cycle	Period	Year	Type	Credits	
Official Master's Degree	1st four-month period	First	Obligatory	4.5	
Language	Spanish				
Teaching method	Face-to-face				
Prerequisites					
Department	Enxeñaría Industrial				
Coordinador	Casteleiro Roca, José Luis	E-mail	jose.luis.casteleiro@udc.es		
Lecturers	Casteleiro Roca, José Luis	E-mail	jose.luis.casteleiro@udc.es		
Web					
General description	This subject aims to give the student knowledge about the various Thermal Systems used today; In addition, the different Cogeneration Systems used to increase the efficiency of the facilities will also be explained; and Biomass will be presented as an option to switch to renewable energy.				

Study programme competences

Code	Study programme competences
A5	CE5 - Analyze energy consumption and its associated costs
A7	CE7 - Have knowledge of the fundamentals, potential, technology, applications and regulations of renewable energy sources
A8	CE8 - Analyze and include renewable energies in different facilities
A9	CE9 - Make decisions in a technological environment where materials are used in efficiency applications
A11	CE11 - Design and analyze cogeneration systems
A12	CE12 - Design and analyze biomass systems
A13	CE13 - Analyze, apply and optimize energy use systems
B2	CB7 - That students know how to apply the knowledge acquired and their ability to solve problems in new or little-known environments within broader (or multidisciplinary) contexts related to their area of study
B5	CB10 - That students have the learning skills that allow them to continue studying in a way that will be largely self-directed or autonomous
B11	CG6 - Acquire new knowledge and skills related to the professional field of the master's degree
B14	CG9 - Apply knowledge of advanced sciences and technologies to professional or research practice of efficiency
C3	CT3 - Use the basic tools of information and communication technologies (ICT) necessary for the exercise of their profession and for learning throughout their lives
C5	CT5 - Understand the importance of entrepreneurial culture and know the means available to entrepreneurs
C6	CT6 - Gain life skills and healthy habits, routines, and lifestyles
C8	CT8 - Value the importance of research, innovation and technological development in the socioeconomic and cultural progress of society

Learning outcomes

Learning outcomes	Study programme competences		
Know the environmental problems related to the generation of electrical energy	AC5 AC7 AC9	BC5 BC11	CC3 CC8
Analyze and know how to design systems based on heat pump	AC7 AC9 AC13	BC2 BC11	CC3 CC6
Analyze and know how to design cogeneration systems	AC8 AC9 AC11	BC5 BC14	CC5 CC6



Analyze and know how to design biomass generation systems	AC5	BC2	CC5
	AC8	BC14	CC8
	AC12		

Contents	
Topic	Sub-topic
Contents described in the verification report	Environmental problems in generation. Systems based on heat pump. Use of residual heat. Biomass cogeneration.
Topic 1: Environmental considerations	1.1. Environmental problems 1.2. Solutions to environmental problems. Renewable energy
Topic 2: Systems based on heat pump	2.1. Operating principle of a heat pump 2.2. Installations based on heat pump 2.3. Facilities sizing
Topic 3: Use of waste heat. Cogeneration	3.1. General aspects of cogeneration 3.2. Technology applied to cogeneration and trigeneration 3.3. Cogeneration and trigeneration power stations
Topic 4: Biomass	4.1. Energy sources 4.2. Municipal Solid Waste 4.3. Process of using biomass 4.4. Domestic applications

Planning				
Methodologies / tests	Competencies	Ordinary class hours	Student?s personal work hours	Total hours
Workshop	A11 A12 A13 B14 C8	1	25	26
Mixed objective/subjective test	A8 A9 B5 C5	2	12	14
Guest lecture / keynote speech	A11 A12 A13 B2 C3	14	25	39
Problem solving	A5 A7 B11 C6	20	25	45
Personalized attention		1	0	1

(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies	
Methodologies	Description
Workshop	Realization of an individual work of a specific subject of the subject and sharing in a group to share knowledge. Later the works will be joined in a common one that will be presented in class by groups.
Mixed objective/subjective test	It consists in carrying out an objective test of approximately 3 hours, in which the acquired knowledge will be evaluated.



(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.