Academic Year 11/12	SEL027	THERMODYNAMICS APPLIED TO RENEWABLE ENERGY SYSTEMS
Department:	724 Heat Engines	
Coordinator:	Xavier Fernández Francos	
Typology:	Block 1. Engineering Courses	Language: English
ECTS: 3	Offered in other degrees: no	Year 1. Semester 2. Spring Semester

OBJECTIVES

The objective of this course is to give students the basis for the understanding of relevant energy production and storage processes related to the use of renewable resources. Fundamental thermodynamics, fluid-mechanics and heat transfer concepts will be reviewed. Elementary processes will be discussed and analyzed using mass and energy balances. Global processes will be discussed and optimized on the basis of energy efficiency and economy criteria.

COURSE DESCRIPTION

1. Basic thermodynamics concepts. Energy. Thermodynamic properties. Mass and energy balances.
2. Energy efficiency. Use of thermodynamic cycles in energy production.
3. CASE ANALYSIS: Use of biomass as a non-fossil fuel.
4. Heat transfer mechanisms. Optimization and design criteria for heat exchangers.
5. Pipe flow. Friction losses. Pumps.
6. CASE ANALYSIS: solar water heating systems.

METHODOLOGY

The course is developed through sessions which will include both theory and practice. The teacher will introduce the fundamental concepts of the course, but the students will be encouraged to further develop these concepts in the analysis of elementary processes. Two relevant case studies, integrating the most relevant theory concepts, will be analyzed.

COURSE EVALUATION

Students will be evaluated through a final exam.

FACULTY

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ADDITIONAL INFORMATION