Materia 4_22: Renewable energy technologies and sustainability

Materia:	Renewable energy technologies and sustainability	**ECTS:**	15
Descriptores	• Bases of design, diagnosis and energy optimization of thermodynamic processes. Thermodynamic analysis and energy optimization of processes in constant composition systems: Power production cycles. Refrigeration cycles and heat pump. Cryogenics Thermodynamic analysis and energy optimization of processes in non-reactive systems of variable composition: Thermodynamic properties of multicomponent systems. Chemical exergy. Thermodynamics of moist air. Psychrometrics. Thermodynamic analysis and energy optimization of processes in reactive systems of variable composition. • Introduction to the energy problem. Highly innovative fuels: Power generation cycles. Energy from renewable sources: Green hydrogen and its applications, Solar thermal energy, Photovoltaic solar energy, Wind energy. Nuclear fission energy. Introduction to fusion energy. Energy and environment. Climate change. Saving measures and optimization of energy consumption. • Role of renewable energies in a sustainable energy context. Basic components and operation of Electric Renewable Energies systems: Solar Photovoltaic, Wind. Thermal Renewable Energies: Solar Thermal, Biomass, Geothermal energy.		
Objetivos generales	This subject has the objective of acquiring knowledge related to the energy-environment binomial from the point of view of sustainable development and of analysing and assess the social and environmental impact of technical solutions.		
Competencia específica	CE-[4-22] - Analyze different technological solutions in order to propose a sustainable one in a real situation.		
Resultados de aprendizaje	• Analyse the impact on improving energy efficiency in thermal installations of various parameters. • Classify the different sources of energy and know the concept of renewable and non-renewable energy. Analyse the design of the most important energy transformation systems. Recognize the importance of having energy and the problems derived from its consumption. • Evaluate the role of renewable energies in a sustainable energy development context. Select the most appropriate renewable energies according to the needs. Understand the components and operation of photovoltaic and wind systems in grid-integrated and isolated configurations. Identify and understand the different variables that affect the design and energy efficiency of the different renewable energy technologies.		
Métodos de evaluación	• Evaluation: Written open-ended test and Problems • Assessment instruments: Checklists and Rating Scales		