

Materia 4_21: Fundamentals of energy technologies

Materia:	Fundamentals of energy technologies	ECTS:	25
Descriptores	<ul style="list-style-type: none"> Thermal properties of pure substances. Estimating thermodynamic properties. Work and heat in quasiequilibrium (ideal) processes. The Laws of Thermodynamics. Introduction to exergy analysis. Multicomponent systems. Partial properties. Fluid properties. Fluid statics. Analysis of the movement of fluids. Differential Dynamics. Integral dynamics. Pressure Flow. Free Sheet Flow. External flow. Introduction to Materials Science and Engineering. Relationship between structure, properties and processing. Bonding in solids. Crystalline structures. Defects in solids and diffusion. Mechanical and thermal properties. Phase equilibrium diagrams. Types of Materials: Metallic materials. Polymeric and composite materials. Ceramic materials. Introduction. Conduction. Convection. Heat exchangers. Radiation. Superposition of different modes of heat transmission. 		
Objetivos generales	<p>This subject has the objective of providing the necessary foundation to undertake the resolution of a large number of specific problems in industrial engineering related with energy technologies and sustainable development. To establish the concepts and results of classical thermodynamics in a general framework that allows its application to the most important industrial processes, analysing stationary and transitory systems, determining performances and efficiencies of these processes, calculating mechanical and calorific powers. To provide an understanding of the physics of fluids and their flow in conduits, and present some of the most important practical applications. To provide the basic training necessary for the knowledge of the properties of engineering materials, with the aim of being able to make a first selection of the most suitable material for each component, equipment or industrial installation. To give the student the fundamental basis about the science of heat transfer in its different modes: conduction, convection and radiation, with a markedly practical approach by solving real problems such as those that can be found later in the industry. To deepen the principles on which the analysis of linear electrical circuits is based, and analyse three-phase systems, which are the basis of the industrial application of electrical energy. To apply these principles to the operation of electrical machines: electrical transformers and rotating electrical machines.</p>		
Competencia específica	CE-[4-21] - Apply the basic principles of materials science, thermodynamics, electric and fluid mechanics to solve basic engineering problems.		
Resultados de aprendizaje	<ul style="list-style-type: none"> Apply the basic principles of Thermodynamics to solving engineering problems. Make calculations and reports of hydraulic installations and compressible fluid systems. Explain the relationship between the microstructure, the synthesis or processing and the properties of the materials. Apply the basic concepts of heat transfer and their application to solve Engineering problems. Justify the influence of insulation on energy savings. Explain the greenhouse effect. Design engineering components used in industry either for heating or cooling. 		
Métodos de evaluación	<ul style="list-style-type: none"> Evaluation: Written open-ended test and Problems Assessment instruments: Checklists and Rating Scales 		