Materia 4_23: Energy systems and technology

Materia:	Energy systems and technology	**ECTS:**	15
Descriptores	• Basic principles of electric circuits. Analysis of electric circuits in sinusoidal steady state. Fundamental theorems of linear electric circuits. Three phase electrical systems. Basic principles of magnetic circuits. Electrical transformers. Rotating electrical machines. • Thermal engines: steam turbines, gas turbines, combined cycles of steam and gas, reaction engines, alternative internal combustion engines. Thermal machines: axial turbomachines, radial turbomachines, volumetric compressors. • Introduction of hydraulic machines: Fundamental principles. Turbomachines. 1st and 2nd Euler equation. Hydraulic turbines: Constituent elements. Fundamental parameters. Efficiency. Hydraulic pumps: constituent elements. Centrifugal pumps. Positive displacement pumps.		
Objetivos generales	This subject has the objective of deepening the principles on which the analysis of linear electrical circuits is based, analyzing three-phase systems, which are the basis of the industrial application of electrical energy and applying these principles to the operation of electrical machines: electrical transformers and rotating electrical machines. Also it has the objective of applying knowledge of thermodynamics and fluid mechanics for the design and calculation of fluid machines and facilities, as well as facilities for the production and use of energy.		
Competencia específica	CE-[4-23] - Apply the basic principles of electrical, hydraulic and thermal machines to solve basic engineering problems.		
Resultados de aprendizaje	• Identify the basic principles of electric circuits. Select the proper method/theorem to analise electric circuits. Analise the behaviour of three phase electrical systems. Identify the basic principles of magnetic circuits. Study the operating principle of electrical transformers. Calculate the equivalent circuit of electrical transformers. Study the operating principle of rotating electrical machines. Calculate the equivalent circuit of rotating electrical machines. • Calculate the energy that can be extracted or contributed to a fluid, as well as the performance that is obtained. Solve problems in the field of engineering in the interaction of fluid systems. • Apply the thermodynamic and fluid-mechanical fundamentals of heat machines and heat engines to the selection of equipment and components. and the analysis and sizing of facilities.		
Métodos de evaluación	• Evaluation: Written open-ended test and Problems • Assessment instruments: Checklists and Rating Scales		