# **Introduction to energetics (ECTS 6)**

Language: the course is offered in English, Serbian and Hungarian.

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**Course description:**

The course covers the following topics:

Macro energy systems and energy flows. Energy, economic and technological indicators of the energy system. Energy of fluid flow, the basic operating principles of turbomachinery, a classification according to the direction of energy transfer, the type of fluid. Pumps and pumping stations. Hydro energy plants and hydraulic machines. The basic operating principles of steam turbines and their application. The basic operating principles of gas turbines and their application. Thermal power plants and the outline of the main and auxiliary technological systems. Heat and electricity co-generation. Environmental protection in thermo energetics. Boiler plants, boilers and appliances. Application of boilers. Appliances and furnaces for burning solid (coal, biomass, urban waste), liquid and gaseous fuels. Machines for cooling/refrigeration, natural and artificial cooling. The processes and equipment for obtaining low temperatures. Systems for heating, ventilation, air conditioning and hot water. The energy efficiency in heating and air conditioning. New and renewable energy sources.

**Aims:**

The course gives a general overview of energy production and energy generation systems functioning and its operation. It focuses on the importance of energy management and the opportunities and challenges are also discussed.

**Learning outcomes:**

Students will acquire basic knowledge of technological systems, energy equipment and processes in thermal power plants, hydro power plants, boiler plants, nuclear power plants and heating systems, refrigeration and air conditioning systems. Students will become familiar with the processes and technical solutions of turbomachinery, such as water turbines, steam and gas turbines, pumps, fans and compressors, as well as advanced methods and solutions for efficient energy consumption, environmental protection and analysis of macro energy system.