

Name of the course	Energetics and the environment
Number of instruction hours	20
Outline of course/module content	Energy and energy conversions, Importance of energy supply, security and availability, Energy systems, Environmental impacts of production and consumption of various forms of energy, chemical and thermal pollution, greenhouse effect, global warming, waste products in energy production, Primary energy sources: conventional and nonconventional, energy reserves, Selection of sources according to requirements of consumers, choice of working media, water as energy carrier, Transformation processes: thermodynamic, technical and economic aspects, Possibilities of energy storing, National energy supply in context of global markets and liberalization of energy market, Importance of energy management in industrial and non-industrial sectors, General approach to energy analysis of industrial processes, energy consumption indicators, types, locations and causes of energy loss, Possibilities of energy savings, existing and new technologies for energy recovery, Level of investments and their expected impact on energy consumption and process energy efficiency, Creation of detailed process schemes for selected industrial processes, quantitative analysis of input and output mass and energy flows, Supply of primary and transformed energy forms and energy share in products costs, Waste heat and its energy potential assessment, Proposal of measures to increase energy efficiency, selection of available technologies in accordance with defined goals and planned investments, Evaluation of technical and commercial risks in implementation of proposed measures, Substitution of sources: renewable and non-renewable sources, availability, technical applicability, effectiveness, criteria for substitution, cogeneration, Examples of energy structure optimization in energy-intensive processes (manufacture of chemicals, paper, plastics, wood, metallurgy, etc.), Sustainable energy management on global level: the Kyoto protocol, a network of industrial energy efficiency, green and white certificates.
Description of instruction methods	Lectures, consultations, interactive work
Description of course/module requirements	seminars, case studies, oral exam