VSB TECHNICAL UNIVERSITY OF OSTRAVA | FACULTY OF MECHANICAL ENGINEERING

Energetics and Environments

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Faculty	Faculty of Mechanical Engineering
Type of study	Bachelor
Language of instruction	English
Code of the programme	B0713A070003
Regular period of the study	3 years
Cost	50,000 CZK per semester
Coordinating department	Department of Power Engineering
Coordinator	doc. Ing. Zbyszek Szeliga, Ph.D.
Keywords	energy sources, environmental engineering, Alternative and renewable energy sources, energetics, operating of energy devices

About study programme

Do you want to become an energy expert? If so, then our study programme Energetics and Environments opens up a wide range of opportunities for you. Both in the field of so-called large-scale energetics, which mainly includes large energy companies such as power plants, heating plants, gas plants and also the energy operations of large chemical, metallurgical, etc., as well as small-scale energetics, because each company has its own energy electricity, heat, gas, compressed air, water, ventilation or air conditioning etc. And so you can meet our graduates in breweries or chocolate factories. And why is the name environmental? This is because today's energy technologies must be operated so as to have the least negative impact on the environment around us.

Graduate's employment

Graduates will be able to work in various jobs in the field of energy.
Within the compulsory elective circuit Operation of Energy Equipment, graduates will find employment in power plants and heating plants, in energy departments in all types of industrial enterprises, in transport organizations and in the non-manufacturing sector, and also in state administration departments. Also in design offices of power distribution, heat supply systems and treatment and waste water treatment plants.
Thanks to their acquired technical knowledge, graduates will find employment in the departments of creation and protection of the environment in all types of industrial, chemical and energy enterprises and organizations dealing with waste management and monitoring and evaluation of the state of the environment. They will also find employment in state administration departments, for example as state authority inspectors.
Specifically, a graduate can work in practice as:
• Operations and design worker in power plants and heating plants or in energy and environmental departments in all types of industrial enterprises, transport organizations and in the non-production field incl. state administration,
• computer engineer and designer in power plants and companies,
• creative worker in design studios focusing on energy,
• inspection and testing technician of power equipment,
• Energy Audit Officer
• a worker holding lower management positions in energy companies.

Study aims

The general objective of this programme is to educate graduates with the knowledge and skills to be able to solve problems of technical practice in the field of energy, ecology and environment. Specific objectives of this study programme can be summarized in

the following points:
• The graduate will have the knowledge and skills equal to a bachelor's degree obtained in the study programme focused on energetics.
• The graduate will be well versed in the disciplines of theoretical foundations of energy engineering, acquire knowledge of hydromechanics and thermomechanics.
• Graduates will also gain knowledge of the basics of heat transfer, combustion and operation of power machines. With regard to the selected compulsory elective group of subjects, students will broaden their professional profile with knowledge in the fields of industrial energy, nuclear energy and operational measurement in energy or waste management, environmental impact of energy practice, ecology and alternative energy sources.
• In addition to the aforementioned knowledge in the field of energy, the graduate will also be familiar with the more general disciplines that will be part of the teaching in the first two years of study: mathematics, computer graphics, physics, solid mechanics, engineering materials and manufacturing technologies, electrical engineering.
• With the expected growth of technology-oriented companies in the region and the demand for technically educated specialists in the field of energy, the graduate will have a high chance of finding employment in the field.
The acquired knowledge and skills will enable the graduate to continue his / her studies in the follow-up Master's study programme Energy Machines and Equipment.

Graduate's knowledge

Students will acquire knowledge concerning the operation, construction and management of power equipment and units, both in the field of "large-scale" and industrial and municipal power engineering. Students will be knowledgeable especially about the problems of utilization of energy sources, their production and possibilities of transformation incl. heat transfer and combustion.
Students of the programme will also be knowledgeable about the links between society and energy practice, such as the importance of energy in our society, ensuring energy self-sufficiency, etc.
The students will also complete the required content of their studies at their discretion by choosing from compulsory elective (CE) courses, which are divided into two compulsory elective circuits (according to two compulsory elective SFE): .(i) Operation of power equipment and (ii) Environment conservation technology.
With regard to the selected compulsory elective group of subjects, students will broaden their professional profile with knowledge in the fields of industrial energy, nuclear energy and operational energy measurement or (ii) or waste management, environmental impact of energy practice, ecology and alternative energy sources. In addition to the aforementioned knowledge in the field of energy, the graduate will also be familiar with the more general disciplines that will be part of the programme in the first two years of study: mathematics, hydromechanics, thermomechanics, computer graphics, physics, solid mechanics, engineering materials and manufacturing technologies.

Graduate's skills

Students will learn to use professional terminology and to process technical documentation in the field of power engineering. They will be able to read technical drawings, learn the principles of the main technical methods of the field (eg, performing energy balances, assessing the energy intensity of processes, etc.) and some of their basic variants can be used in practical contexts. They will be able to design, implement and evaluate energy works, including energy systems, and assess their efficiency. Graduates will also be able to present the results of energy measurements in the form of a technical report and to cooperate on innovative energy enterprises. The graduates will be able to perform basic diagnostic measurements of low power equipment, analyze the use of energy sources and perform basic calculations of nuclear power equipment based on the knowledge from compulsory elective courses in the Operation of Energy Equipment field. As a part of the compulsory elective courses of the Environmental Protection Technology course, graduates will have gained the ability to solve technical problems related to waste management and energy ecology. Furthermore, they will understand the impact of energy practice on the environment, including the ability to design alternative energy sources.

Graduate's general competence

Graduates of the study programme are able
• to make independent and responsible decisions even in partially known contexts on the basis of a framework assignment
• to coordinate the team's activities and take responsibility for their results according to the framework assignment and allocated resources
• Include ethical thinking in problem solving
• Communicate comprehensibly and convincingly to professionals and lay people about the nature of professional problems and their own opinion on their solution
• use their professional knowledge, professional skills and general competence in at least one foreign language
• independently acquire further professional knowledge, skills and competences based primarily on practical experience and its evaluation, but also by independent study of theoretical knowledge of the field.

Professions

- Power engineering auditor
- Power engineering design engineer
- Power engineering project manager

Hard skills

- Energy machinery and equipment
- Renewable energy sources
- Knowledge of principles and use of heat and combustion engines
- Orientation in the field of thermal energy equipment
- Knowledge of creating energy balances and standardization of energy consumption
- Reading technical documentation
- Knowledge of the use of alternative energy sources
- Knowledge of calculations and design of heat exchangers
- Determination of efficiency of thermal and energy equipment
- Applications of the basics of thermodynamics in power engineering and thermal engineering
- Orientation in technical drawings
- Energetical protection in power engineering
- Application of natural sciences in energy and thermal engineering
- Energy calculations
- Fuel combustion calculations
- Heat transfer calculations in buildings and facilities
- Knowledge of properties of the gaseous, liquid, and solid fuels

Study curriculum

- form Full-time (en)