

# Study programme Applied Sciences and Technologies

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<b>Faculty</b>	Faculty of Mechanical Engineering
<b>Type of study</b>	Bachelor
<b>Language of instruction</b>	English
<b>Code of the programme</b>	B0588A170002
<b>Title of the programme</b>	Applied Sciences and Technologies
<b>Regular period of the study</b>	3 years
<b>Cost</b>	50,000 CZK per semester
<b>Coordinating department</b>	Department of Mathematics and Descriptive Geometry
<b>Coordinator</b>	prof. RNDr. Radek Kučera, Ph.D.
<b>Key words</b>	Applied Science, Mathematics

## About study programme

Applied Sciences and Technologies represent a unique study program not only at VSB-TU Ostrava that combines mathematics and other natural sciences with programming and engineering applications. If you are interested in any of that, or in all together, it is a perfect choice for you. You can look inside particular technical specializations that our university offers during your Bachelor's study. After that, you can decide what exactly suits you best for the Master's study.

## Professions

- Researcher
- Research and development team member
- Analyst

## Hard skills

- Mathematical methods and analyses
- Process simulation
- Management methods
- Knowledge of materials
- Finite element method
- Matlab
- Numerical methods
- Processing and evaluation of experimental data

## Graduate's employment

The study program prepares students primarily for study in the follow-up Master's degree program. If a graduate of the Bachelor's degree study does not continue in the study, s/he may find employment as an assistant junior researcher, laboratory technician, laboratory specialist, lecturer, lecturer in science courses at universities, officer in the departments of administrative and management authorities, or programmer.

## Study aims

The Bachelor's degree program Applied Sciences and Technologies belongs to the university study programs. It offers a study of broad natural science rudiments in mathematics, physics, and engineering. A deeper theoretical foundation achieved due to higher number

of hours allocated for the above-mentioned subjects will enable the undergraduates to consider an interdisciplinary context and use the acquired knowledge and skills in engineering applications creatively.

## **Graduate's knowledge**

The undergraduate has knowledge:

- in mathematics covering topics of linear algebra, mathematical analysis, differential equations, partial differential equations, numerical methods, statistics, complex variable functions, optimization methods, discrete mathematics
- in physics covering topics of kinematics, mechanics of rigid bodies, oscillations, waves, thermodynamics, statics and dynamics of liquids and gases, the study of the electricity and magnetic fields, optics and fundamentals of nuclear physics, as well as the experimental measurement and evaluation of researched phenomena
- from technical courses focused on algorithms and programming, fundamentals of electronics, measurement and signal processing, sensor technology, automatic control, mechanics, fluid mechanics and thermodynamics, heat transfer, material sciences and testing

## **Graduate's skills**

The undergraduate will be able to:

- apply knowledge in mathematics and physics to describe studied natural and physical phenomena, or to analyze, describe and calculate chemical reactions, etc. S/he will be able to solve mathematical tasks using analytical methods, as well as appropriate numerical methods. S/he will be able to create algorithms and to program the proposed procedures
- use methods and techniques of mathematical modeling of physical phenomena and processes focused on the tasks described by differential equations including the design of an adequate mathematical model
- apply methods of solving electrical circuits and describe their basic elements, explain the principles and possibilities of connecting basic semiconductor elements and to design simple electronic circuits, such as amplifiers, oscillators, stabilizers, etc.
- apply methods of mechanics, mechanics of elastic bodies, solve plane mechanisms and perform stress analysis
- characterize the most important properties of materials and define the procedures of their determination, define the basic parameters of the internal structure of solids. S/he will be able to assess the relationship between the structure of materials and their utility properties, to predict the possible kinds of material damage with respect to the internal structure
- propose, carry out and evaluate a basic laboratory experiment
- present and vindicate their professional opinions and the results of their experimental work

## **Graduate's general competence**

A graduate of Bachelor's degree program of Applied Sciences and Technologies has extensive natural science foundation needed for future engineering studies. Within the study of mathematics, physics, chemistry and related subjects, s/he acquires the knowledge needed for mastering the study of engineering methods in the follow-up Master's degree program.

The graduate profile is completed by social-scientific courses providing knowledge in the field of engineering ethics and communication skills.

## **Study curriculum**

- form Full-time (en)