

Advanced Engineering Technologies and Materials

Doctoral study programme | concise programme guide

Programme code	P0715D270032
Programme type	doctoral, academically oriented
Language of study	English
Mode of study	full-time and combined
Standard duration	4 years
Degree awarded	Ph.D.
Programme guarantor	prof. Dr. Ing. Libor Beneš, IWE
Core areas	engineering technologies 60%; materials engineering 40%

Programme focus

The programme prepares researchers capable of conducting independent, high-quality research in engineering technologies and materials engineering. It develops analytical thinking, critical evaluation of current knowledge, advanced research skills and the ability to design innovative solutions with relevance to industrial practice.

Main research areas

Engineering technologies

- foundry engineering, alloy design, refining, inoculation and modification
- forming of metallic materials and thermal effects
- weldability, modelling and optimisation of welding processes
- machining and grinding, optimisation of cutting conditions
- simulation processes, machine systems and technical applications

Materials engineering

- development and testing of metallic and composite materials
- corrosion, tribological, thermal, mechanical and adhesion properties
- surface protection of metals
- micro- and nanocoatings, laser coating and ion implantation
- advanced material testing methodologies

How the study is organised

- The study follows an individual study plan and is centred on independent research.
- Students complete two compulsory courses: English for Technical Sciences and Basics of Research Methodology.
- Together with the supervisor, students select two theoretical and two field-specific courses.
- The study includes scientific publications, presentations at international conferences and international research experience.
- Progress is reviewed regularly by the supervisor and the doctoral programme board.
- The programme is completed by the defence of the doctoral dissertation.

Full-time and combined mode

Full-time mode	Close involvement in the academic environment, laboratories and research projects of the faculty.
Combined mode	Greater flexibility and the possibility to connect doctoral research with professional or industrial practice, including research conducted at an external workplace.

Graduate opportunities

- universities, research institutes and scientific centres
- industrial research and development departments
- management of research and innovation projects
- development of materials, manufacturing processes and technologies
- technology transfer, specialist consultancy and senior engineering roles

Examples of research topics

- development of new alloys and optimisation of material processing
- micro- and nanocoatings with specialised properties
- advanced material analysis and testing
- optimisation of machining, grinding, welding and forming
- modern metallurgy and additive technologies
- modelling, simulation and optimisation of engineering systems

Before applying

A prospective dissertation topic should be discussed with a potential supervisor. Admission requirements, deadlines and mandatory documents are governed by the current official admission notice.