Information Technology in Material Science

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Faculty	Faculty of Materials Science and Technology
Type of study	Follow-up Master
Language of instruction	English
Code of the programme	N0688A270002
Regular period of the study	2 years
Cost	50,000 CZK per semester
Coordinating department	Department of Materials Engineering and Recycling
Coordinator	doc. Dr. Mgr. Kamil Postava

About study programme

Are you interested in new technologies and materials, innovations, and advanced data analysis methods? How about combining this with natural sciences to find solutions to key challenges facing today's industry?

Join us in a dynamic world where natural sciences, computer science, and materials engineering come together. The goal of studying is not to sit over theory, but to gain practical skills that you will use in building your career. That is why, from the very first semesters, you will be actively involved in work in state-of-the-art laboratories. You will gain practical skills in the preparation and characterization of advanced nanostructures and technologies for the preparation of components and equipment for the modern optical, electronic, and energy industries. In addition, we will teach you to analyze the data obtained using the latest tools of artificial intelligence, machine learning, and virtual reality. During your studies, you will also have the unique opportunity to participate in real research projects and collaborate on new solutions.

What's next? This unique program was developed in collaboration with leading technology companies, ensuring you direct contact with the real industrial environment. In addition, the national supercomputing center IT4Innovations is involved in teaching, giving you the opportunity to work with state-of-the-art computing technologies, such as quantum computers.
Join us and become part of the future. Thanks to close cooperation with industry (e.g., Onsemi), access to state-of-the-art technologies, and opportunities for international cooperation, you won't just dream about cutting-edge technologies—you'll actively create them! Kick-start your career at the intersection of science, technology, and innovations.

Graduate's employment

The study program is based on the current needs of industry in the Moravian-Silesian Region in the field of interconnecting materials, technical, and information education (e.g., OnSemi, Forvia Hella, companies associated within the Czech Optical Cluster, etc.). Thanks to their solid practical education in mathematics, physics, chemistry, and computer science, graduates will also find employment in research organizations, universities, or in the implementation of their own business plans.

Study aims

The aim of the follow-up master's program is to provide high-quality technical education in the interdisciplinary field of physics and chemistry of materials with a solid foundation in applied mathematics and computer science. The main objective is to combine knowledge of the function and technology of component and device preparation for the modern optical, electronic, and energy industries with modern methods of computer science and data processing.

Graduate's knowledge

Graduates of the follow-up master's program will gain a comprehensive education in materials science with a focus on physics, chemistry, mathematics, and modern information technology. The technical and scientific foundation includes applications of integral and differential calculus, matrix methods, solving equations describing physical phenomena, electromagnetic fields, solids, optical and quantum mechanical phenomena. This knowledge is combined with education in the areas of data processing, modeling of physical processes in materials and components, the use of artificial intelligence, virtual reality, and high-performance quantum computing.

Graduate's skills

Graduates will acquire practical skills in thin film preparation, lithography, surface treatment, crystal growth, spectroscopy, and microscopy built on a solid technical foundation. The technical skills of graduates are complemented by their ability to use information technology, computer-controlled experiments, data processing, modeling, and calculations using modern software, machine learning, artificial intelligence, or virtual reality. Emphasis is placed on individual guidance of students in the context of their graduate theses, practical implementation of teaching in the university's scientific laboratories and the IT4Innovations supercomputing center, practical teaching in industrial enterprises, and internships at foreign universities.

Graduate's general competence

Graduates are guided towards independent creative work through practical exercises using modern instrumentation and computing infrastructure, including supercomputing capacities. They learn to publish and present the results of their work. Throughout their studies, and especially when working on their theses, they are guided towards the critical use of information sources and artificial intelligence tools.

Study curriculum

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