

## MASTER'S STUDY - GRADUATE PROFILE

### Process Automation and Informatization in Industry

Knowledge gained during the bachelor's studies (science, technology and engineering basics combined with fundamentals in automation and related fields) is deepened by knowledge in natural science and principle subjects. The most essential subjects are oriented on system modelling, simulation and optimization; information security management systems; industrial control systems; designing components for complex control systems; advanced control methods; methods for system diagnosis; integrating information and control systems across all levels of control and methods and techniques of knowledge acquisition for the hierarchical process control.

Graduates are immediately able to enter the labour market as well as to continue education at the doctoral level. They are qualified to analyse, design, implement and maintain monitoring and dispatching systems used for technology and production processes control. They understand system diagnostics methods and are capable of providing creative solutions for control systems and management decision support systems in various enterprises and organizations. They are able to solve problems related to information and control systems integration and understand methods and techniques of knowledge acquisition for the hierarchical control of processes.

They are equipped with managerial, economic, legal, environmental and ethical awareness and are capable of applying it at professional life.

A graduate is competent to be employed in the field of development, design and use of automated control systems in industrial enterprises, but also in institutions providing design and research of control and information systems, as well as at schools and educational institutions.

**Guarantor:** Dr. h. c. prof. Dr. Ing. Oliver Moravčík

**Study advisor:**

### Integrated safety

The purpose of this master's degree programme integrated safety focuses on the acquisition of theoretical and practical knowledge based on the present state of science and to manage their use in professional or with continued follow-up doctoral studies. The aim of cross connection between science education, technical and engineering disciplines and the study of health and safety at work is to profile graduates with the knowledge that can later be successfully used in further career growth, continuing studies at doctoral degree or in the technical praxis.

Graduate can work in the field of health and safety at work place and the environment, particularly as regards self-management, and assessing the performance of the work environment in working with hazardous substances, reserved technical devices, fire, safety and environmental engineering. Graduates can measure the characteristics of hazardous substances and can assess and analyze the risks contained in the working and living environment.

Graduates could be applied as a manager of the teams in the field of occupational health and safety, fire protection, management systems, safety and the environment.

**Guarantor:** prof. Ing. Maroš Soldán, PhD.

**Study advisor:**

### **Materials Engineering**

The Master degree of study programme Materials Engineering is based on the present state of science and technology in the field of materials (metallic materials, plastics, ceramics, glasses, composites), used in practice. The graduate has the advanced knowledge about influence of chemical composition and structure of materials on mechanical, technological and utility properties of materials of semi-products and final products. He/she has the knowledge about advanced materials and very special materials as nanomaterials, biomaterials, biodegradable materials, memory-shape materials, metallic foams, superconductors, materials for high-temperature applications, and others. He/she knows the advanced methods of materials production and technological processing of materials to form the semi-products, components and final products (vacuum technology, plasma and laser technologies, electron beam technologies, powder metallurgy, surface modifications, nanotechnologies). He/she is educated in modelling of phase equilibria in materials and simulations of production and processing of materials. He/she is skilled in analysis of structure and phase composition of materials (scanning and transmission electron microscopy, X-ray diffraction, and others) and special techniques of testing of materials properties, as fracture mechanics, fatigue testing, creep properties, corrosion testing, and others. He/she knows the main degradation processes and their influence on the properties of materials.

The graduate is ready to enter the labour market in the field of testing of materials using advanced techniques, cooperation with engineers and technology experts in planning and processing of materials to components, tools and products. High-rated graduates can continue in education in Doctoral study in the study branch Materials or related study branches

**Guarantor:** prof. Ing. Peter Grgáč, CSc.

**Study advisor:**

### **Machining and Forming Technology**

The master study focuses on preparation of specialists in the field of machining and forming technology for employment in industry or sector of research and development. Graduate has deep theoretical knowledge in the field of production technologies (machining, welding, forming, foundry and assembly), materials, production machines, tools, process design, metrology and systems of quality assurance supported by the knowledge of CAx technologies. It has predictions for systematic and complex solving of material, technological and managerial problems of production processes with goal to racionalize, modernize and design of new products, processes and systems.

Graduate finds application in the field of product, process and production systems designing, in the technological shop floors, research, development and service as a production technologist, technologist - CNC programmer of machine tools, member or leader of development teams, production coordinator or project manager.

**Guarantor:** prof. Ing. Peter Šugár, CSc.

**Study advisor:**

### **Personnel Policy in Industrial Plant**

The study programme provides the acquisition of knowledge and skills in the field of industrial engineering (particularly analysis and rationalisation of work, ergonomics, technical preparation of production, quality management, operational analysis, innovation, information and project management), and specifically focusing on personnel work in an industrial enterprise (career management and employee development, employee performance management, recruitment services, intercultural management).

The graduate gains knowledge in project management, the economic return on the investment in employees, total quality management in the context of sustainable development and the stabilisation of employees in key positions.

The graduate is able to prepare methodological guidelines for line managers, to provide support for the implementation and adoption of amendments, provide advice on career management and succession, to create systems, tracking and talent management, prepare and organise internal audit personnel, develop competency models and systems, staff evaluation, complex systems for training and the development of employees, and apply the different personnel indicators in the context corporate social responsibility principles. The graduate is able to work in international and interdisciplinary teams.

The graduate can apply the knowledge especially at a middle management level in an industrial plant in HR departments, as a manager of the personnel department, specialised departments in medium and large firms in the area of payroll and financial management, the departments of education and development, career counseling, planning, recruitment and selection of staff or in social work in industrial enterprises. The graduate has a disposition to work as an independent consultant and career coach. The graduate has developed the skills to hold positions at the senior management level in the company, in the position of HR manager or PR manager.

**Guarantor:** prof. Ing. Peter Sakál, PhD.

**Study advisor:**

### **Computer-Aided Design and Production**

The study programme includes the up to date scientific and industrial knowledge, necessary for engineering practice or as preparation for PhD. study. The major subjects are focused on independent work of students on semestral projects. The graduate have skills to be production engineer.

The graduate can be a team leader of teams making engineering computer analysis, simulations of production processes and projects of production lines. The graduates can be also a team leaders of teams for computer technical preparation of production and they can be company managers or entrepreneurs in the area of production application of computers

and CA systems. The graduates obtain second stage university education. The companies are interested in students during their study and therefore graduates obtain job in the area of their study programme.

**Guarantor:** prof. Dr. Ing. Jozef Peterka

**Study advisor:**

### **Industrial Management**

The study programme provides the acquisition of knowledge and skills in the field of Industrial Engineering (particularly the design of production systems, their modelling and simulation, production management, operational analysis, and rationalisation of work, ergonomics, innovation, investment and project management).

The study also includes social sciences and the development of language competencies.

The graduate is able to solve complex problems in technical as well as in managerial areas at middle and senior management level. The graduate is able to plan, design, implement, coordinate and monitor engineering projects in manufacturing, logistics, process management, ergonomics, quality and so on. The graduate is also able to execute corrective measures to improve the efficiency of working conditions to increase productivity and reduce production costs. The graduate is able to create corporate and business strategies with a focus on sustainable development, and is also able to work in the area of applied industrial research and innovation. The graduate is able to use the methods of project management in the planning and implementation of small and medium-sized projects and work in international and interdisciplinary teams.

The graduate can apply the knowledge in organisations of various industries, especially at middle and senior management levels and wherever it is needed to achieve synergy of managerial, economical, technical, humanitarian and social knowledge and skills in the application of advanced tools, methods and techniques for industrial engineering.

The graduate is able to integrate and optimise processes in an industrial enterprise undertaking techniques to increase the overall efficiency of the organisation activities.

The graduate is prepared to continue with Doctoral Study and to build a scientific perspective in a range of industrial engineering areas.

**Guarantor:** prof. Ing. Miloš Čambál, CSc.

**Study advisor:**

### **Production Technologies and Production Management**

After completing the second stage of the study the graduates will be able to continue the third stage of the study, or to enter the job market. Due to professional skills, the graduates will find application as a production technologist.

The graduate can work as production engineers for production preparation, members and leaders of development teams. The tasks, which can be solved by the graduate, correspond to master degree and the proposed graduate profile.

**Guarantor:** prof. Ing. Alexander Čaus, DrSc.

**Study advisor:**

### **Production Devices and Systems**

The master's degree program production devices and systems aims to obtain theoretical and practical knowledge, based on the present state of science. The main idea behind this is that students may be able to apply such knowledge in their professional life and/or in the possible continuance in higher education through a doctoral program.

This program allow students to consolidate and deepen their bachelor's degree in a particular field of study manufacturing Technology. The main subjects in the study program are oriented to applied mechanics, machine, components and modules for the construction of production technology, logistics, automation and programming of production and handling devices, design, operation and maintenance of production equipment and systems, as well as diagnostics, reliability and safety engineering systems. Subjects of the fields of management are included as well

**Guarantor:** prof.h.c.prof.Ing. Karol Velíšek, CSc.

**Study advisor:**

### **Welding and Joining of Materials**

The graduate of study program is prepared to immediately enter the labour market, study the 3<sup>rd</sup> degree program as well as further professional education. He/she manages the analytical abilities, is capable to critically evaluate today's knowledge of science and technology, to design and implement required technological processing of engineering materials, to assess quality of weldments according to international standards, to predict a lifetime of weld structures or other joints made by welding, as well as to judge their safety. During the exercise of his/her profession he/she can simultaneously apply acquired managerial, economical, legal, ecological and ethic awareness.

The graduate can be asserted in an industrial production, designing departments, R&D, as well as service, certification and management fields. He/she can work as technologist, designer, member or leader of R&D team, quality control person, production coordinator, project manager, sales representative etc.

**Guarantor:** prof. Ing. Milan Marônek, CSc.

**Study advisor:**