

# Control and Information Systems

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<b>Faculty</b>	Faculty of Electrical Engineering and Computer Science
<b>Type of study</b>	Follow-up Master
<b>Language of instruction</b>	English
<b>Code of the programme</b>	N0714A150002
<b>Title of the programme</b>	Control and Information Systems
<b>Regular period of the study</b>	2 years
<b>Coordinating department</b>	Department of Cybernetics and Biomedical Engineering
<b>Coordinator</b>	prof. Ing. Jiří Koziorek, Ph.D.
<b>Key words</b>	Digitalization of Industry, Industry 4.0, Industrial automation, Measurements and Sensors, Automation, Control and Robotics

## About study programme

The undergraduate master's degree program Control and Information Systems provides graduates with the education necessary to ensure today's much-needed automation, digitization and robotization in companies in the industry and other areas of human activity. The digitization of industry is a key trend for the graduates of the program are well prepared. They acquire comprehensive expertise and practical experience for a wide range of companies, including engineering ones who develop and deliver automation, robotics, measurement systems, embedded electronics, as well as in manufacturing companies where maintenance, digitization, etc. have to be tackled.

## Professions

- Programmer and developer in the area of industrial processes digitization
- Automation systems designer
- Testing of electrical systems specialist
- Intelligent building systems designer
- Robotic systems designer
- Digitalization of industry specialist
- Industrial information systems programmer

## Hard skills

- Calibration and verification of sensors
- Automation
- NI LabVIEW programming language
- AD/DA converters
- PLC programming
- Measurement of electronic devices
- Industrial automation
- Measurement of electrical and non-electrical quantities

## Graduate's employment

The employability of graduates in the labor market is excellent. The number of graduates is currently unable to meet requirements raised by companies.

Typical employers of program graduates are as follows:

- Companies engaged in engineering in automation, measurement, development of embedded electronic systems.
- Companies engaged in mechanical production, production of electronic products, companies being active in metallurgy and many others, where automation and digitization of production have to be tackled.
- Due to the fact that the specialization is quite broad and it combines the knowledge of electrical engineering and computer science, graduates are also often employed in companies dealing with information technologies, communication technologies, etc.

## **Study aims**

The aim of the study program is to prepare experts in the field of control, information and measurement systems. Graduates are able to independently solve complex technical tasks related to the design, implementation and maintenance of control, measurement and information systems.

The technical areas targeted by the study plan have currently been undergoing rapid development. Concepts such as production digitization, Industry 4.0, automation, robotics are key trends in the industry. Graduates of the study program will be able to meet the requirements of companies in these areas. This is due to the structure of the study plan of the program, which combines both cybernetics, measurement, electronics, signal processing, and application software development.

The program is based on three pillars:

The theoretical basis of the program is mathematics.

Basic theoretical subjects of the profiling base are focused on cybernetics, measurement and signal processing.

The subjects of the profiling base are divided into three blocks, which form a set of appropriately connected objects. Students are obliged to select one block.

The blocks of the profiling base are as follows:

Industrial Automation - This block is suitable for students whose main priority is the application of industrial automation and robotics.

Computers and Information Systems in Control - This block is suitable for students whose main priority is embedded control systems, design of their own electronics based on microprocessor techniques, creation of application software for these devices.

Measurement and Testing Systems - This block is suitable for students who want to take a closer look at measurement technology and virtual instrumentation.

These core areas of the study program are further complemented by a wide range of optional subjects within which the student has the opportunity to set up his / her study plan according to their preferences.

Within the study of the program the emphasis is given on graduates being able to systematically solve complex tasks, to master the engineering approach, work in the team and work with different sources of information.

## **Graduate's knowledge**

Graduates of the specialization are university-educated electrical engineers with knowledge of industrial automation, computer systems, microprocessor techniques, robotics and information systems. This knowledge is supported by a good theoretical basis of mathematics, theoretical electrical engineering, theory of automatic control and measurement.

Graduates are profiled into the following areas:

- Automation and Robotics - The subjects are appropriately designed so that a student gains as much information as possible from the field of industrial automation, industrial communications, and the basics of robotics. The knowledge spectrum should provide the graduate with a good applicability to employers dealing with industrial control systems.
- Computers and Information Systems in Control - This specialization emphasizes embedded microprocessor control systems and computer information systems. Graduates are ready to work with employers involved in the development of microprocessor and

information systems.

- Virtual Instrumentation and Measurement - The composition of the subjects profiles the graduate into the field of virtual instrumentation, automated measurement and testing systems.

### **Graduate's skills**

The graduate thus not only masters the so-called lower level of control characterized by various means of automation or measurement techniques, but he also masters a higher level of control characterized by various software means, human-machine interface, including application software for control systems. Thus, the combination of knowledge is highly requested in the labor market and it is unique.

### **Graduate's general competence**

Graduates are able to adapt and apply in solution of professional problems in various fields of electrical engineering and computer science. Graduates of the field are able to systematically solve complex tasks, they master the engineering approach, work in the team, and they are capable of working with different sources of information. In particular, they apply to the development and design of control and information systems within all areas of human activity, their implementation and maintenance. Graduates also apply in the field of research and development of measurement and control technology and information technologies for their control and production, in the field of services, transport, etc. An important advantage of graduates is the fact that they are well equipped with knowledge both in the field of electronics and in the field of information systems, and they are able to effectively link these areas.