Management of Industrial Systems

Generated: 24. 11. 2026

Faculty	Faculty of Materials Science and Technology
Type of study	Doctoral
Language of instruction	English
Code of the programme	P0413D270001
Regular period of the study	4 years
Coordinating department	Department of Industrial Systems Management
Coordinator	doc. Ing. Šárka Vilamová, Ph.D.
Keywords	quality management, economics and management, industry, information systems, automation and control

About study programme

The study program is based on a systemic, integrated concept of managing industrial activities and processes in market economy conditions. As a balanced interconnection of knowledge of industrial economics and management, advanced quality management and intelligent control systems with technical and technological knowledge, the study program is oriented mainly to production systems of the metallurgical, chemical and engineering industries.

Graduate's employment

Management of industrial business activities at strategic and tactical levels, including employment in design and research institutions. Top managers of industrial enterprises, management representatives for technical and economic areas of industrial business, quality management systems and integrated management systems, information systems and technologies. Engineers and specialists in technical, economics, marketing, quality management departments, third party conformity assessment bodies, departments related to modernization of automation-based technological and manufacturing processes, creation and use of computer networks, implementation and management of enterprise management and information systems.

Study aims

The aim of the study program is to equip students with a balanced knowledge of the principles, approaches, methods and tools of the industrial management economics, the theory and methodology of integrated industrial management with technical and technological knowledge. The study is focused mainly on production systems of the metallurgical, chemical and engineering industries. The program covers the fields of economics and management of industrial systems, advanced quality management and intelligent control systems in industry.

Graduate's knowledge

- Management and managerial decision making while respecting the economic, technical and organizational and logistics specifics of metallurgical, chemical and engineering production. Reflection of integrated management theories, approaches and methods in real management processes.
- Managerial economics and its technical and technological specifics in industrial systems. Advanced tools of economic diagnostics of industrial business entities.
- Concepts, methods and tools of modern quality management and their application in production and non-production spheres. Special statistical methods of quality management. Advanced procedures for planning and improving quality and their application in various industries.
- Principles and procedures for integrating management theories, concepts and systems. Development and application of models of

excellence in industrial organizations.
- Modelling and simulation of dynamic systems. Theory of optimal control and automation of technological processes. Projection and programming of information systems.

Graduate's skills

- Designing an industrial business and supply chain strategy. Management of the property and capital structure of a business entity. Innovation management. Evaluation, improvement and design of business processes in industrial sectors.
- Implementation and maintenance of quality management systems and integrated management systems. Application of system approach to solving problems in the field of products and processes quality. Application of statistical methods. Evaluation of maturity of industrial organization management systems.
- Creative solutions to individual elements of control systems and their integration. Analysis, design and implementation of automatic regulation of technological processes using modern methodologies, measuring, control and computer systems.
- Forming and managing the work team. Argumentative evaluation of team work results.
- Pedagogical work on the basis of professional knowledge and generalized experience of the graduate.

Graduate's general competence

- The ability of independent scientific research and independent creative activity in the field of industrial systems management.
- Ability to design and use advanced research practices in a way to extend the current state of knowledge - at all levels of management of an industrial business entity.
- Self-decision-making ability in the business sphere - with a view to working in a competitive environment of the globalized economy.
- Ability to understand and convincingly present their own economic and managerial skills and solving problem practices to other members of the scientific community at international level (at least in one world language) and the general public.

Professions

- Scientific researcher for process control

Hard skills

- Production quality management
- Knowledge of process optimization
- Warehouse management
- Accounting Act
- Presentation and defense of work results
- Knowledge of signal processing methods
- Industrial logistics
- Knowledge of battery systems
- Knowledge of mechanical engineering technologies
- Knowledge of the quality system ČSN EN ISO 9001
- Integrated management systems
- 2D design programmes
- VAT Act
- Nondestructive testing - ultrasound
- Accounting
- ERP system
- Computer support for quality management
- Financial instruments
- C#
- Calibration and verification of sensors

- Low voltage
- Knowledge of the theory of maintenance systems
- Knowledge of automation
- Basics of spectral analyses
- Income Tax Act
- Knowledge of maintenance management
- PCB design
- Production organization and management
- Knowledge of metallurgical processes in metal production
- Knowledge of quality monitoring and evaluation
- Measurement of electrical and non-electrical quantities
- Designing production systems
- Basics of labour law legislation
- Knowledge of process improvement methods
- Management of production and pre-production processes
- SW 3D/CAD
- The human factor in quality management
- Marketing
- Design of switching power supplies
- Demonstration of product conformity
- Knowledge of the basics of marketing activities
- Programming of industrial PLC applications
- C++
- Procedures and methods of quality planning
- Robot programming
- Business administration
- Design of switching power supplies
- Industrial engineering
- Industrial automation
- Knowledge of data analysis
- Financial reporting
- Python programming language
- SW Matlab
- Mathematical methods and analyses
- Knowledge of management methods and techniques
- Quality management
- Design of analog electronic circuits and their simulation (Pspice)
- Knowledge of technological processes
- Basics of wage legislation
- Programming of industrial PCs
- Preparation of production
- AD/DA converters
- Project management
- Design of linear power supplies
- Statistical methods
- Quality management systems
- Statistical methods of quality management
- Budgeting
- Change management

- Tax system of the Czech Republic
- Methods and tools of quality management
- Knowledge of the basics of business economics
- Quality control
- Applied informatics and management
- Knowledge of industrial management methodology
- Basics of business law
- Management methods
- Knowledge of IFS quality system
- Organization management
- Asynchronous generators
- Managerial knowledge

Study curriculum

- form Full-time (en)
- form Part-time (en)