



# UNIVERSITY OF ŽILINA

## Faculty of Mechanical Engineering

### FACULTY OF MECHANICAL ENGINEERING MASTER'S DEGREE STUDY

#### CONTACT

##### Faculty of Mechanical Engineering / Strojnica fakulta

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##### All the questions concerning your studies will be attended at the Department of Studies:

Tel.: 041/513 25 07, 25 08

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## ACCREDITED STUDY PROGRAMMES FOR THE ACADEMIC YEAR 2017/2018

MASTER'S DEGREE STUDY PROGRAMMES	
FULL-TIME LENGTH OF STUDY 2 YEARS	PART-TIME ** LENGTH OF STUDY 3 YEARS
Automated Production Systems *	
Machining and Bearing Production *	-
Computer Aided Design and Simulations in Mechanical Engineering *	-
Mechanical Engineering Technologies *	-
Industrial Materials *	-
Machines and Equipment Design *	Design of Machinery and Equipment -
Industrial Engineering and Management *	-
Environmental Technique *	-
Vehicle Maintenance *	-
Vehicles and Engines *	-
-	Mechanical Engineering

*\* study programme is also accredited in the English language*  
*\*\* the standard tuition fee for part-time study is 600 € for an academic year*

##### Detailed information on particular study programme

- syllabus,
- course information sheets

can be found at <http://vzdelavanie.uniza.sk/vzdelavanie/plany.php>.



## FOLLOW-UP STUDIES AFTER COMPLETION OF MASTER DEGREE STUDIES

- There is a possibility of extended studies within follow-up doctoral degree programmes at the Faculty of Mechanical Engineering UNIZA in the academic year 2017/2018 – Automated Production Systems, Mechanical Engineering Technologies, Industrial Materials, Machine Parts and Mechanisms, Computer Modelling/ Design and Machine Mechanics, Energy Machines and Equipment, Rail Vehicles, Industrial Engineering and Management (respective information about particular study programme is available at the university website).

EXPECTED NUMBER OF ACCEPTED APPLICANTS TO THE FIRST YEAR: MASTER ´S DEGREE STUDY		
STUDY PROGRAMMES / FIELD OF STUDY	PLANNED CAPACITY	
	FULL-TIME	PART-TIME
<b>Automated Production Systems</b> / Mechanical Engineering	20	-
<b>Machining and Bearing Production</b> / Mechanical Engineering	20	-
<b>Computer Design and Simulations in Mechanical Engineering</b> / Mechanical Engineering	20	-
<b>Mechanical Engineering Technologies</b> / Mechanical Engineering	20	-
<b>Industrial Materials</b> / Mechanical Engineering	20	-
<b>Machines and Equipment Design</b> / Transport Machines and Equipment	20	-
<b>Industrial Engineering and Management</b> / Industrial Engineering	40	-
<b>Environmental Technique</b> / Energy Machines and Equipment	20	-
<b>Vehicle Maintenance</b> / Machines and Equipment Maintenance	20	-
<b>Vehicle and Engines</b> / Motor Vehicles, Rail vehicles, Ships, Aircrafts	30	-
<b>Mechanical Engineering</b> / Mechanical Engineering	-	30
<b>Total number</b>	230	30



## TERMS AND CONDITIONS OF ADMISSION

1. **The fundamental prerequisite of** being accepted to the graduate study programme (second degree) is full completion of the undergraduate study of the first degree (Higher Education Act, n.131/2002 Coll.).
2. **Health certificates** – the faculty does not require any confirmations of health status and accepts all the applications without any health certificates for all degrees of the university studies



## FORMS OF ACCEPTANCE

### 1. No entrance exams

- all the applicants have to pass the selection procedure.

### 2. Selection Procedure

- selection procedure is carried out in a form of an interview in order to ensure that the accepted candidates dispose of the necessary skills and abilities.

## Rules of Selection Procedure

- within the selection procedure, the results achieved during the undergraduate study, the result of the state examination and the passed undergraduate study programmes in the same or similar field of study will be evaluated. No entrance examinations take place.



## ADMISSION OF FOREIGN STUDENTS

The same terms and conditions of admission are applicable as for the applicants from abroad as for the applicants from Slovakia.

Foreign students who study in a foreign language (i.e. not Slovak), pay the tuition fee as stated in § 92 Subsection 8 (Higher Education Act). The tuition fee is specified by the UNIZA directive for the respective academic year, which can be found on the university website.

Students from abroad who study in the Slovak language do not have to pay the tuition fee. The applicants from the Czech Republic who want to apply and study in Žilina can use the application form available in the Czech Republic. The applicants who do not actively speak Slovak or Czech are required to attend the language training. (It is possible to attend the Slovak for Foreigners courses at UNIZA).

For foreign applicants who were accepted on the basis of international agreements or Slovak government grants, terms and conditions stated in respective agreements are applicable.



## HOW TO APPLY

**Application forms are to be submitted for individual study programme.**

**In case the applicant is interested in more study programme, it is necessary to apply for each one individually, including payment of the respective admission procedure fees.**

Applicants have to fill in the form *Prihláška na vysokoškolské štúdium - 2. Stupeň* or they can also use an electronic application form that can be found on the university website: <https://vzdelavanie.uniza.sk/prijimacky/index.php> or on the education portal: [https:// prihlaskavs.sk/sk/](https://prihlaskavs.sk/sk/).

Even in case of electronic application form, it is required to print it, sign it, enclose other required documents including the proof of payment of the fee and send it to the address Sjf UNIZA within the stipulated deadlines.

Incomplete study application or application sent after the deadline will not be accepted.

In the absence of or failure of entrance exams, the faculty does not refund the admission fee.

If an applicant wants to take part in entrance exams at more faculties of UNIZA, the application forms have to be sent separately to each faculty and the respective admission procedure fees paid separately to each faculty.

**Enclosures for the master´s degree programme (to be sent with application forms):**

- Curriculum Vitae,
- Payment confirmation statement,
- copy of the Diploma.

### Admission fee:

Send 20 € to:

Žilinská univerzita, Univerzitná 1, 010 26 Žilina

Bank: Štátna pokladnica

IBAN: SK34 8180 0000 0070 0026 9861

const. symbol: 0308

variable symbol: 10232 - inžinierske štúdium

**Payment method:** payment can be paid by bank transfer or postal order to the account above.  
**Payment confirmation statement:** is to be sent to the Faculty with the application form.

With payment of the admission fee from the EU member states, the EES countries, territories that are considered a part of the EU (Treaty of Rome, Section 299) and SEPA countries, it is necessary to use BIC: **SPSRSKBAXXX**, IBAN: **SK34 8180 0000 0070 0026 9861**.

**Tuition fees** - in accordance with the Higher Education Act, information about the amount of tuition for the respective academic year will be announced on the website of the University of Žilina.



## USEFUL DATES

Open Day	Deadline for application form submission	Entrance exams
November, 22, 2016 February, 8, 2017	until April, 30, 2017	June, 29, 2017



## ACCOMMODATION

Accommodation facilities of the University of Žilina offer accommodation according to their capacity, taking the distance between the student's residence and the main location of the university into account. **Monthly fees for accommodation: 41€ - 51€.**



## BOARD

Students can use services of catering facilities at the University of Žilina. **The prices vary from 0,80 € to 2,30 €.**



## SCHOLARSHIPS

Students of all study programmes can obtain motivational scholarships (for excellent results or exceptional achievements) in accordance with the stated criteria. **Students of selected study programmes can obtain motivational departmental scholarships in accordance with the stated criteria.**



## GRADUATE PROSPECTS

### MASTER ´S STUDY PROGRAMMES

#### **AUTOMATED PRODUCTION SYSTEMS**

##### **(Field of study 5.2.1 Mechanical Engineering)**

The study programme Automated Production Systems is focused on issues of automation and computer support in production technologies, in particular on flexible manufacturing systems in mechanical engineering, computer support in pre-production stages, design in automated mechanical engineering industry, on the field of digitally controlled production machines, robot technology, application of microelectronics and computing techniques in production technologies, and creation of control systems for automated machinery equipment.

The base of the knowledge of the study programme graduates is there in the area of production technologies for mechanical engineering, further in the field of technological processes of production of semi-finished goods, production technology and assembly of spare parts, technical preparation, design of production processes and systems, handling, transport and storage of components in the context of the rationalisation of engineering production, economics and management of mechanical engineering, automation and computer support.

The graduates are able to systematically and comprehensively solve material, technological and organizational issues of the production technologies using automated tools and approaches as well as computer support in pre-production, production and post-production stages of the spare parts implementation based on the methods of mathematical modelling, simulation and optimisation. The graduates´ abilities are integrated with knowledge of economic character.

The students are prepared for the study programme of the third degree in one of the related fields of study.

The graduates find employment as members of the middle management level of production, in the departments of technical production, especially in the field of technological design with computer support, in the field of design and management of flexible production systems, in research and development of technological processes and systems and implementation of automation in mechanical production.

#### **MACHINING AND BEARING PRODUCTION**

##### **(Field of study 5.2.1 Mechanical Engineering)**

The professional profile of the study programme Machining and Bearing Production graduates is characterised by the theoretical but mainly practical knowledge of construction, technological design and engineering technologies, production facilities and automation, quality of mechanical production, economics and production control and by habits and abilities of the skilful application of the acquired knowledge in practice. The graduates obtain theoretical but mainly practical knowledge of the most widespread technologies in mechanical engineering and bearing production, as well as of automation of mechanical engineering and bearing production. They acquire habits and skills in design and technological activities and in application of modern technological tools. The graduates also have the advanced knowledge in the field of production, testing, technological processing, selection, exploitation and degradation of properties of the main types of technical materials. The graduates are able to operate mainly in industrial businesses: in the field of technical material production, their technological processing to semi-finished goods and products as well as in quality control, purchase, sale, service and maintenance. The graduates are qualified to work in operation of industrial engineering companies, in the automobile industry, bearing industry, in all areas of engineering technologies using machining and in other organizations of the economic, production, operation or diagnostic character. The graduates acquire appropriate knowledge in the field of electronics, mechatronics, robotics as well as in the field of computer-aided mechanical engineering and manufacturing. They feature sufficient practical experience and skills in laboratory work, they master professional terminology in a foreign language, and they are able to apply economic methods necessary for operation of the existing systems.

#### **COMPUTER AIDED DESIGN AND SIMULATIONS IN MECHANICAL ENGINEERING**

##### **(Field of study 5.2.1 Mechanical Engineering)**

The master ´s study programme Computer Aided Design and Simulations in Mechanical Engineering graduates are able to creatively use methods of calculation, simulation and verification of model solutions in the design of mechanical systems and their constructions. The main emphasis is put on their readiness and ability of independent development, elaboration

and practical application of engineering approaches when solving technical problems in the field of linear and nonlinear response of constructions. The graduates are able to perform static, kinematic and dynamic analysis of mechanisms and constructions, to assess lifetime and reliability of the investigated objects. They are capable of analysing thermal stress, to solve technical tasks of flow, thermodynamics, heat and material transfer. The graduates receive adequate knowledge of information technology, foreign languages and economic as well as legal aspects of the field. They are able to properly formulate technical problems, to analyse and solve them. They have an overview of general and scientific approaches and methods. They are able to comprehensively assess and recognize what is essential in the design and diagnostics of mechanical systems and constructions not only in relation to the problem, but also to the environment. They master modern numerical methods of computational dynamics in order to identify and analyse fields such as methods of finite and infinite elements and passports, marginal elements and others. They are employable in the field of optimal structural design of machines, constructions and industrial products, technological units and equipment. In their work they are able to use software aided engineering tools such as: AutoCAD, Inventor, Pro/Engineer, Mechanical Desktop, Solid Edge, Ideas, Catia, MATLAB, Mathematica, MathCAD, Maple, ANSYS, ADINA, Marc, Nexis, SYSWELD, ADAMS, and others. The graduates are able to model, simulate and analyse different types of fields separately or in their interaction as a bound problem be it the subject of macro-mechanical systems or the micro- and nanostructures. The graduates are able to programme a formulated technical problem into a computer programmes and transform it into design. They acquire basic knowledge in the field of experimental mechanics. The graduates are employable mainly in the field of designing, evaluation and innovation of construction of machines and technological equipment.

### **MECHANICAL ENGINEERING TECHNOLOGIES** **(Field of study 5.2.1 Mechanical Engineering)**

The professional profile of the Mechanical Engineering Technologies study programme graduates is characterised by theoretical but mainly practical knowledge of construction and mechanical engineering technologies, production facilities, quality, economics and production control and by abilities and capabilities of the skilful application of the acquired knowledge in practice. The graduates receive theoretical but mainly practical knowledge of the most widespread non-cutting technologies in mechanical engineering production and its control. They acquire habits and skills in technological activities and in application of modern technological tools. The graduates also have expertise in the field of production, testing, technological processing, selection, exploitation and degradation of properties of the main types of technical materials. They are able to operate mainly in industrial businesses: in the field of technical material production, their technological processing to semi-finished goods and products as well as in quality control and assurance, in purchase, sale, service and maintenance. The graduates are qualified to work in operation of industrial mechanical engineering companies, in rail and public transport, in all areas of mechanical engineering and in other organisations of administrative, production, operating or repair character. They feature sufficient practical experience and skills in laboratory work, too and they have a good command of professional terminology in a foreign language.

### **INDUSTRIAL MATERIALS** **(Field of study 5.2.1 Mechanical Engineering)**

The graduates in the study programme Industrial Materials master methods of calculation, simulation and verification of model solutions of designing, machinery construction and machinery systems; they have knowledge of new materials, theory and technology of their production and processing, methods of their evaluation and influencing of their performance; they master creation and management of technological and production processes in machinery, they have adequate knowledge of testing, operation and maintenance of machinery, further knowledge of selection of appropriate materials and engineering operations impacts on the environment.

The graduates are able to analyse, design, construct and maintain large-scale technical solutions covering the area of mechanical engineering with an emphasis on industrial materials; they are able to conduct research with a high degree of creativity and independence. They have deep knowledge in the fields of mechanical engineering that allows them to manage teams of workers in this field, lead projects independently and take responsibility for complex solutions. They are able to build a respectable scientific approach. During their studies the students gain experience in formulation of hypothesis, experimental design, testing hypotheses and data analysis; they are able to apply advanced methods and techniques of design and development of technical materials for the needs of mechanical engineering constructions.

### **DESIGN OF MACHINERY AND EQUIPMENT** **(Field of study 5.2.3 Transport Machines and Equipment)**

The graduated in the second degree studies deepen their knowledge of applied sciences focused on the design and construction of machines and equipment. In the course of the master's degree study the attention is paid to the equipment and technologies currently used in the development and construction of machines, equipment and their prototypes. The students have the possibility based on the choice of offered optional subjects for further enhancement of their knowledge. Knowledge of design, construction materials, construction methodology, innovation, methods of

calculation and simulation for structural and dynamic analysis and optimisation of construction parts and nodes, based mainly on the finite element method, currently form a necessary base for the successful operation of constructors and designers of machines and machinery equipment on the European labour market.

Mastering of modern methods of computer modelling and simulation, computer projecting, design and construction, as well as experimental methods in the field belong to the knowledge and skills of the study programme graduates. In addition, they include managing routine work with systems for 3D modelling and design, such as Creo, Catia and with systems for analysis, simulation and optimisation, focusing mainly on systems Ansys and Adams, or Opti Struct. The graduates acquire knowledge and skills of how to practically use technology for Rapid Prototyping and Reverse Engineering in the field of machine and equipment development and innovation.

The students demonstrate their expertise and skill in particular when solving semester projects and diploma thesis. The study programme completes with the state examination and thesis defence.

The graduates gain knowledge of construction, design and testing of machinery and equipment in general. During the study, students receive theoretical and methodological basis of professional and practical experience necessary for solving a wide range of issues related to the design, projecting and construction of machines and equipment.

The graduates are employable especially in the field of research and development, in the design, projecting and construction of machines and equipment based on sophisticated methods and procedures.

## **INDUSTRIAL ENGINEERING AND MANAGEMENT**

### **(Field of study 5.2.52 Industrial Engineering)**

The graduates are qualified to get involved in the solution of technical-organisational and development areas, primarily at the middle management level of a manufacturing company. They are prepared to solve complex tasks in the field of logistics and management of supplier chains, in-house logistics and optimisation of inventories and material flows, implementation of all-company information systems, planning and production control, quality management, design of production processes and systems, management of innovations, introduction of industrial engineering methods in individual company departments, computer modelling of company processes, project management, application of operational research methods, etc. The graduates in the master's degree study programmes Industrial Engineering and Management are employable mainly in positions of middle management of manufacturing organisations and in departments of industrial engineering. They are prepared to occupy posts of system engineers, quality engineers, productivity engineers, designers of production systems, production engineers, employees of technical preparation of production, industrial engineers, heads of production planning and control, heads of logistics department, heads of maintenance department, employees of human resources department, and others. They are qualified to work also at the top management level.

## **ENVIRONMENTAL TECHNIQUE / TECHNOLOGY**

### **(Field of study 5.2.6 Energy Machines and Equipment)**

Within the second degree of their professional education in applied sciences the graduates gain good theoretical and methodological professional basis and practical experience necessary for solving a wide spectre of problems related to the designing, projecting and operation of heating, ventilation and air conditioning systems and other facilities that are applied in heating, ventilation and gas systems, taking advantage of modern computing methods.

The study programme Environmental Technique deals with comfort microclimate and cleanliness of the environment inside buildings (residential, office, industrial buildings), power equipment with the help of which it is possible to create and adjust the internal environment, and with the use of different energy sources. The graduates are employable in the design, projecting and operation of heating, air conditioning and gas systems as well as in those areas solving problems of reduction of the technological processes' energy intensity, of efficient use of thermal energy (both in industry and in municipal construction) and issues of utilisation of renewable (alternative) energy sources.

## **VEHICLE MAINTENANCE**

### **(Field of study 5.2.2 Machines and Equipment Maintenance)**

The graduate in the study programme Vehicle Maintenance is after the successful completion of the master's degree studies capable of performing work of a Maintenance Engineer. The Maintenance Engineer has a good command of the methodology and procedures of implementation and operation of transport means, he/she has knowledge of their construction and operation, masters methods of analysis and evaluation of reliability of technical and operational systems, methodology of sophisticated procedures in creating complex maintenance systems of transport means applied in industry and service systems, methodology and procedures of designing and implementing maintenance information systems at the managerial level (Computer Maintenance Management Systems – CMMS). The graduate acquires knowledge and practical skills in methodical approaches and creation of procedures in project management of operation

and maintenance in complex care for machines and equipment. Moreover he/she gains knowledge and experience of model simulation and verification of solutions of machine operation, taking into account the real impact of interactions on operation and the environment, of methods of technical management and procedures for maintenance activities associated with the operation of vehicles as well as technical diagnostic methods. The graduates are employable mainly in designing of complex maintenance systems, in management, in organisation and technical preparation of transport means maintenance, in control, organisation and technical preparation of service activities related to the operation of transport means, in the field of managing services and business related to machines and their equipment, as well as private entrepreneurs (in engineering) in the field of maintenance, service and sale of machines.

## **VEHICLES AND ENGINES**

### **(Field of study 5.2.4 Motor Vehicles, Rail vehicles, Ships, Aircrafts)**

The graduates in the second degree study programme Vehicles and Engines are able to analyse, design, construct, operate and maintain large-scale technical systems of vehicles especially in the field of automotive vehicles and their power drive subsystems. They are able to use solutions with a high degree of creativity, complexity, autonomy and responsibility. They have a thorough knowledge of basic theoretical disciplines of mechanical engineering (engineering mathematics, mechanics of vehicles, elasticity and plasticity) as well as in the field of construction and design of vehicles and their subsystems. They have a general overview of mechanical engineering production and its management, expert knowledge of the theory of road and rail and combustion engines. They gain instruction in the field of public transport means, technical means of combined transport, maintenance technologies, and optionally, of the aircraft power plants, too.

Their deepened and expanded knowledge of theoretical and practical subjects enables the graduates of the master's degree study programme Vehicles and Engines to find and present their solutions to problems of research, development, projection and construction of transport means, especially vehicles and their systems. The graduates can creatively apply their knowledge in practice, critically analyse and apply the full range of concepts, principles and practices of the field in the context of loosely defined problems, and demonstrate effective decision making regarding selection and use of methods, techniques and tools. They are able to implement complex technical solutions, to utilise modern methods and tools in order to solve problems. The graduates of the second degree study programme Vehicles and Engines are able to work effectively as individuals or as team members or team leaders, to cooperate with the superior units, to continually increase their qualifications, including the development of technical and managerial skills, to keep in touch with the latest developments in their discipline, to follow appropriate practices in accordance with the rules and professional, legal and ethical framework of their subject field.

The graduates are able to design and to provide modern construction solutions of vehicles and their subsystems using advanced computer-aided technologies. They are able to find work in operation of vehicles, especially rail vehicles, road vehicles, internal combustion engines, hydraulic and pneumatic machines and equipment for their diagnostics, maintenance and repairs. The graduates meet conditions for the further education in the third (doctoral) degree studies, especially in the study programme Rail Vehicles.

## **MECHANICAL ENGINEERING**

### **(Field of study 5.2.1 Mechanical Engineering)**

The professional profile of the Mechanical Engineering study programme graduates is characterised by theoretical but mainly practical knowledge of construction and mechanical engineering technologies, production facilities and automation, quality of mechanical production, economics and production control and by abilities and capabilities of the skilful application of the acquired knowledge in practice. The graduates receive theoretical but mainly practical knowledge of the most widespread technologies in mechanical engineering production and in the field of automation of mechanical engineering. The graduates acquire habits and skills in construction, design and technological activities and in application of modern technological tools. The graduates also have basic knowledge in the field of production, testing, technological processing, selection, exploitation and degradation of properties of the main types of technical materials. They are able to operate mainly in industrial businesses: in the field of technical material production, their technological processing to semi-finished goods and products as well as in quality control and assurance, in purchase, sale, service and maintenance. The graduates are qualified to work in operation of industrial mechanical engineering companies, in railway and public transport, in all areas of mechanical engineering and in other organisations of administrative, production, operating or repair character. The graduates have adequate knowledge and skills in the field of electronics, mechatronics, robotics, drives, as well as in the field of computer-aided mechanical engineering manufacturing. They feature sufficient practical experience and skills in laboratory work, they master professional terminology in a foreign language, and they are able to apply the basics of economic methods necessary for operation of the existing systems.