



FACULTY OF MECHANICAL ENGINEERING

MASTER'S DEGREE STUDY

UNIVERSITY OF ŽILINA

Faculty of Mechanical Engineering

CONTACT

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ACCREDITED STUDY PROGRAMMES OFFERED FOR THE ACADEMIC YEAR 2021/2022

MASTER'S DEGREE STUDY PROGRAMMES	
FULL-TIME STUDY	PART-TIME STUDY **
LENGTH OF STUDY 2 YEARS	LENGTH OF STUDY 3 YEARS
Automated Production Systems *	-
Machining and Bearing Production *	-
Computer Modelling and Simulations in Mechanical Engineering *	-
Mechanical Engineering Technologies *	-
Technical Materials *	-
Machines and Equipment Design *	-
Industrial Engineering *	-
Environment Technology *	-
Vehicle Maintenance *	-
Vehicles and Engines *	-
Mechanical Engineering ***	-
-	Mechanical Engineering

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

Detailed information on particular study programmes

- Syllabus,
- course information sheets

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



EXPECTED NUMBER OF ACCEPTED APPLICANTS TO THE FIRST YEAR

MASTER'S DEGREE STUDY		
STUDY PROGRAM / FIELD OF STUDY	PLANNED CAPACITY	
	FULL-TIME	PART-TIME
Automated Production Systems / Mechanical Engineering	20	-
Machining and Bearing Production / Mechanical Engineering	20	-
Computer Modelling and Simulations in Mechanical Engineering / Mechanical Engineering	15	-
Mechanical Engineering Technologies / Mechanical Engineering	20	-
Technical Materials / Mechanical Engineering	20	-
Machines and Equipment Design / Mechanical Engineering	20	-
Industrial Engineering / Mechanical Engineering	40	-
Environment Technology / Mechanical Engineering	20	-
Vehicle Maintenance / Mechanical Engineering	20	-
Vehicles and Engines / Mechanical Engineering	30	-
Mechanical Engineering / Mechanical Engineering	15	
Mechanical Engineering / Mechanical Engineering	-	30
TOTAL	240	30

In case of a low number of applicants for full-time study, the Faculty retains the right not to open the study programme and to offer applicants another study programme.

In case of a low number of applicants for part-time study, the Faculty retains the right not to open the study programme.



TERMS AND CONDITIONS OF ADMISSION

Basic condition of admission

The basic condition for admission to master's (engineering) degree study (study programme of the second degree) is the full completion of the first degree of university study (Higher Education Act, no. 131/2002 Coll.). In case of a foreign applicant or a student who has completed his / her study abroad, he / she shall submit along with the application form (no later than the date of enrolment) a decision on the recognition of the certificate of completion of the first degree of higher education recognized by a relevant institution in the Slovak Republic or he / she shall ask UNIZA for the recognition of the certificate of education.

Other conditions of admission

1. No entrance exams

All applicants have to pass the admission procedure.

2. Admission Procedure

Admission procedure is carried out in the form of a selection procedure in order to ensure that applicants with the necessary skills and abilities will be admitted to study.

Rules of Selection Procedure

Within the selection procedure, the results achieved during bachelor's degree study, results of the state examination and completed bachelor's degree study programme will be evaluated. No entrance examinations will take place.



ADMISSION OF FOREIGN STUDENTS

The basic and other 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 and published for the respective academic year on the university website. Foreign students who study in the Slovak language do not have to pay the tuition fee. Applicants from

the Czech Republic who want to apply and study at UNIZA can use the application form valid in the Czech Republic. Applicants who do not actively speak Slovak or Czech are required to attend the language training (it is possible to attend the Slovak language courses at UNIZA). For foreign applicants who were accepted on the basis of intergovernmental agreements, bilateral agreements or Slovak government grants, terms and conditions stated in respective documents are applicable.



APPLICATION FORM

Application forms are to be submitted for individual study programmes.

In case the applicant is interested in more study programmes, 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/>.

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 of the Faculty of Mechanical Engineering UNIZA within the stipulated deadlines. Incomplete application form or application form sent after the deadline will not be accepted.

In case of non-participation in the admission procedure or a failure in the admission procedure, the Faculty does not refund the admission procedure fee. If the applicant wants to take part in the admission procedure at several faculties of UNIZA, the application forms must be submitted separately to each faculty with the payment of the relevant fee.

Enclosures for the master´s (engineering) degree study programmes (to be sent with application forms):

- Curriculum Vitae,
- proof of payment of the admission fee,
- copy of Diploma.

Admission fee:

Send **20 €** to: Žilinská univerzita v Žiline, 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.

Proof of payment:

proof of payment is to be sent to the Faculty with the application form.

Tuition fees – in accordance with the Higher Education Act, information about the amount of tuition fee for the relevant academic year will be published on the website of the University of Žilina in Žilina within the stipulated deadlines.

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.**



USEFUL DATES

Open Day	Deadline for submitting the application form	Entrance exams
October, 22, 2020 January, 26, 2021	until March, 31, 2021	June, 29, 2021



ACCOMMODATION

The accommodation facilities of the University of Žilina in Žilina provide accommodation according to the accommodation capacity, taking into account the distance between the student´s permanent residence and the seat of the University.

Accommodation fee: € 54 – € 61 / month.



BOARD

Students can use the services of the catering facility of the University of Žilina in Žilina. **Price for food: € 1.10 – € 3.20.**



SCHOLARSHIPS

Students of all study programmes can obtain motivational scholarships (for excellent results or exceptional achievements) in accordance with the stated criteria. **Students of all study programmes can obtain motivational departmental scholarships in accordance with the stated criteria.** In case of an unfavourable social situation, the student can apply for a social scholarship during the study.



FOLLOW-UP STUDIES AFTER COMPLETION OF MASTER'S (ENGINEER) 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 2020/2021 - Automated Production Systems, Mechanical Engineering Technologies, Industrial Materials, Machine Parts and Mechanisms, Computer Modelling and Machine Mechanics, Energy Machines and Equipment, Rail Vehicles, Industrial Engineering (respective information about particular study programme is available at the university website). After completing the master's degree, it is necessary to verify the current state of the offer of study programmes in a particular academic year.



GRADUATE PROSPECTS

MASTER'S (ENGINEER) DEGREE STUDY PROGRAMMES

AUTOMATED PRODUCTION SYSTEMS

(Field of study 2381 Mechanical Engineering)

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

The basis of the acquired knowledge of graduates of this study programme will be in the field of production technologies for mechanical engineering, technological processes of production of semi-finished products, technology of production and assembly of components, technical preparation of production, design of production processes and systems, handling, transport and storage of components in the context of the rationalisation of mechanical production, economics and management of mechanical engineering production, automation and computer support.

Graduates are able to systematically and comprehensively solve material, technological and organizational issues in production technologies with the use of automated tools and approaches as well as computer support in pre-production, production and post-production stages of component implementation based on methods of mathematical modelling, simulation and optimisation. Skills are integrated with the knowledge of an economic nature.

Students will be prepared to study a programme of the third degree in a related field of study. Graduates will find employment as members of the middle management level of production, in 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 2381 Mechanical Engineering)

The professional profile of graduates of the study programme Machining and Bearing Production is characterised by theoretical and practical knowledge of constructology, construction technology and mechanical engineering technologies, production equipment and automation, quality of mechanical engineering production, economics and production management and

habits and abilities and to skilfully apply this knowledge in practice. Graduates acquired theoretical and practical knowledge of the most common technologies of mechanical engineering and bearing production, as well as in the field of automation of mechanical engineering and bearing production. Graduates will acquire habits and skills in construction, design and technological activities, using modern technological means. Graduates also have engineering knowledge in the field of production, testing, technological processing, selection, exploitation and degradation of the properties of the main types of technical materials. They are prepared to work mainly in industrial companies in the field of production of technical materials, their technological processing into semi-finished products and products as well as in the field of quality control, purchase, sale, service and maintenance. Graduates are qualified to work in the operation of industrial mechanical engineering companies, in the automotive industry, bearing industry, in all areas of mechanical engineering technologies applying machining and in other organisations of economic, production, operational or diagnostic nature. Graduates have adequate knowledge and skills in the field of electronics, mechatronics, robotics, as well as in the field of computer-aided mechanical engineering production. They have 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 the operation of existing systems.

COMPUTER MODELLING AND SIMULATIONS IN MECHANICAL ENGINEERING

(Field of study 2381 Mechanical Engineering)

Graduates of the master's (engineering) degree study programme Computer Modelling and Simulations in Mechanical Engineering are able to creatively use the methods of calculation, simulation and verification of model solutions in the design of mechanical systems and constructions. The main emphasis is put on their readiness and ability to independently develop, elaborate and practically use engineering approaches when solving technical problems in the field of linear and nonlinear response of constructions. Graduates are able to perform static, kinematic and dynamic analysis of mechanisms and constructions and to assess lifetime and reliability of the examined objects. They can analyse thermal stress, solve technical problems of flow, thermodynamics, heat and mass transfer. Graduates have 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 structure not only in relation to the problem, but also to the environment. They master modern numerical methods of computational mechanics in order to identify and analyse fields such as methods of finite and infinite elements, boundary elements and others. They are employable in the field of optimal design of machines structures, building constructions and industrial products, technological units and equipment. In their work they are able to use software 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. Graduates are able to model, simulate and analyse different types of fields separately or in interaction as a bound problem in macro-mechanical systems as well as in the micro- and nanostructures. They are able to program the formulated technical problem into a computer program and transform it into a design solution. They acquired basic knowledge in the field of experimental mechanics. Graduates are mainly employable in the field of design, evaluation and innovation of machine construction and technological equipment.

MECHANICAL ENGINEERING TECHNOLOGIES

(študijný odb Field of study or 2381 Mechanical Engineering)

The professional profile of graduates of the study programme Mechanical Engineering Technologies is characterised by theoretical but mainly practical knowledge of constructology and mechanical engineering technologies, production facilities, quality, economics and production management as well as habits and ability to skilfully apply this knowledge in practice. Graduates have acquired theoretical and practical knowledge of the most widespread chipless technologies of mechanical engineering production and its management. They acquired habits and skills in technological activities with the use of modern technological tools. Graduates also have professional knowledge in the field of production, testing, technological processing, selection, exploitation and degradation of properties of the most commonly used types of technical materials. They are especially prepared to work in industrial companies in the field of production of technical materials, their technological processing into semi-finished products and products, as well as in the area of quality control and assurance, purchase, sale, service and maintenance. Graduates are qualified to work in the operation of industrial mechanical engineering companies, in railway and urban public transport, in all areas of mechanical engineering and in other organisations of administrative, production, operational or repair nature. They have sufficient practical experience and skills in laboratory work and they have a good command of professional terminology in a foreign language.

TECHNICAL MATERIALS

(Field of study 2381 Mechanical Engineering)

Graduates of the study programme Technical Materials master the methods of calculation, simulation and verification of model solutions of projection, construction of machines and machinery systems; they have knowledge of new materials, theory and technologies of their production and processing, methods of their evaluation and influencing their performance; they are

familiar with the creation and management of technological and production processes of machinery, they have adequate knowledge of testing, operation and maintenance of machinery, they have also knowledge of selection of suitable materials and the impact of engineering operations on the environment. Graduates are able to analyse, design, construct and maintain extensive technical solutions involving the area of general mechanical engineering with an emphasis on technical materials; they are able to carry out research with a high degree of creativity and independence. They have a deep knowledge in the field of general mechanical engineering that allows them to manage teams of workers in this field, to lead projects independently and to take responsibility for complex solutions. They are able to build a respectable scientific approach. During their studies, students will gain experience in the formulation of hypotheses, experimental design, hypotheses verification and analysis of the acquired data; they are able to apply advanced methods and techniques of design and development of technical materials for the needs of mechanical engineering constructions.

MACHINES AND EQUIPMENT DESIGN

(Field of study 2381 Mechanical Engineering)

Graduates of the second degree study will deepen their knowledge of applied scientific disciplines focused on the design and construction of machines and equipment. As part of the engineering degree study, attention is also paid to the equipment and technologies currently used in the development and construction of prototypes of machines and equipment. Based on the choice of offered optional subjects, students have the opportunity to further enhance their professional orientation. Knowledge of construction, construction materials, construction methodology, innovations, methods of calculation and simulation for structural and dynamic analysis and optimisation of construction parts and nodes, based mainly on the finite element method, is now an essential basis for the successful application of constructors and designers of machines and machinery equipment on the European labour market. The knowledge and abilities of graduates of this study programme include mastering of modern methods of computer modelling, computer aided design and construction, as well as experimental methods in the field. In addition, they include routine mastery of 3D modelling and design systems such as Creo, Catia and systems for analysis, simulation and optimisation, focusing mainly on systems Ansys and Adams, or Opti Struct. Graduates will learn to use the technologies of Rapid Prototyping and Reverse Engineering in the field of machine and equipment development and innovation. Students will demonstrate their professional knowledge and skills especially in solving semester projects and diploma thesis. The study programme ends with the state examination and defence of the diploma thesis. Graduates will acquire knowledge of construction, design and testing of machines and equipment in the general sense of the word. During their study, students will acquire theoretical and methodological professional basis and practical experience necessary to solve a wide range of issues related to the design, projecting and construction of machines and equipment. 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

(Field of study 2381 Mechanical Engineering)

Graduates (engineers) are qualified to get involved in the solution of technical-organisational and development areas, primarily at the middle management level of the production organization. They are prepared to coordinate the solution of complex tasks in the field of logistics and management of supply chains, in-house logistics and optimisation of inventory and material flows, implementation of company-wide information systems, planning and production management, quality management, design of production processes and systems, management of innovations, implementation of industrial engineering methods to individual company units, computer modelling of company processes, project management, application of operational research methods, etc.

Graduates of the study programme Industrial Engineering are employable especially in the positions of middle management of production organisations and in departments of industrial engineering. They are prepared to occupy positions 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.

ENVIRONMENT TECHNOLOGY

(Field of study 2381 Mechanical Engineering)

Following the first degree of study, graduates in the second degree of their professional study acquired good theoretical and methodological professional basis and practical experience from applied scientific disciplines, necessary to solve a wide range of problems related to the design, projecting and operation of heating, ventilation and air conditioning systems and other equipment that are applied in heating, ventilation and gas systems, using modern calculation methods. The study programme Environment Technology deals with the comfort of the environment in the interior of buildings (residential, office, industrial halls), energy installations with the help of which it is possible to create and influence the environment with the use of various

energy sources. Graduates are employable in the fields of designing, projecting and operation of heating, air conditioning and gas systems, as well as in areas solving the problems of reduction of energy performance of technological processes, more efficient use of thermal energy (both in industry and in municipal construction) and the use of renewable energy sources.

VEHICLE MAINTENANCE

(Field of study 2381 Mechanical Engineering)

Graduates of the study programme Vehicle Maintenance are competent after completing the engineering degree of university study to perform the profession - Maintenance Engineer. Maintenance Engineer masters the methodology and procedures for the deployment and operation of vehicles, he/she has the knowledge of the design and operation of vehicles, masters the methodology of analysis and evaluation of reliability of technical and operational systems, methodology of sophisticated procedures for creating complex maintenance systems of vehicles used in production and non-production systems, methodology and procedures for designing and deploying maintenance information systems at the managerial level (Computer Maintenance Management Systems – CMMS). Graduates have knowledge and practical skills about methodological approaches and creation of project management procedures of operation and maintenance management in complex care of machines and equipment. The knowledge is supplemented by simulation and verification of model solutions of machine operation with regard to the real interaction on the impacts of operation and environment, methods of technical management and procedures of maintenance activities connected with the operation of vehicles, methods of technical diagnostics. Graduates are employable especially in the design of complex maintenance systems, in the management, organisation and technical preparation of service activities related to the operation of vehicles, in the management of services and trade related to machines and equipment, as well as independent entrepreneurs (in engineering) in the field of maintenance, service and sale of machines.

VEHICLES AND ENGINES

(Field of study 2381 Mechanical Engineering)

Graduates of the second degree study programme Vehicles and Engines are able to analyse, design, construct, operate and maintain extensive technical systems of vehicles, especially in the field of vehicles and their propulsion subsystems. They are able to use solutions with a high degree of creativity, complexity, independence and responsibility. They have a thorough knowledge in the field of basic theoretical disciplines of mechanical engineering (engineering mathematics, vehicle mechanics, 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 vehicles and combustion engines. Their education is complemented by the study of urban public transport means, technical means of combined transport, maintenance technologies, and, optionally, aircraft engines. Deepened and extended knowledge of theoretical and professional subjects allow graduates of the engineering degree study programme Vehicles and Engines to find and present their own solutions to problems in research, development, design and construction of transport means, especially vehicles and their systems. Graduates creatively apply the acquired knowledge in practice, critically analyze and apply a variety of concepts, principles and practices of the field in the context of freely defined problems, while demonstrating effective decision-making in connection with the selection and use of methods, techniques and tools. They are able to implement complex technical solutions, use modern methods and means in order to solve problems. Graduates of the second degree study programme Vehicles and Engines are able to work effectively as individuals, as team members or team leaders, cooperate with superiors, continually upgrade their qualification, including the development of technical and managerial skills, keep in touch with the latest developments in their discipline, follow appropriate practices in accordance with the rules and professional, legal and ethical framework of the field.

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

MECHANICAL ENGINEERING

(Field of study 2381 Mechanical Engineering)

The professional profile of graduates of the study programme Mechanical Engineering is characterised by theoretical and practical knowledge of constructology and mechanical engineering technologies, production equipment, quality, economics and production management, as well as automation of mechanical engineering production and habits and ability to skilfully apply this knowledge in practice in European economic area with a strong competitive environment. Graduates will acquire theoretical as well as practical knowledge of the most widespread chipless and chip technologies of mechanical engineering production and its management. They will acquire habits and skills in technological activities, using modern technological tools and Hi-Tech systems. Graduates also have professional knowledge in the field of production, testing, technological processing, selection, exploitation and degradation of the properties of the most commonly used types of technical materials. They are

especially prepared to work in industrial companies in the field of production of technical materials, their technological processing into semi-finished products and products, as well as in the field of quality control, purchase, sale, service and maintenance. Graduates can widely work in the operation of industrial mechanical companies and in all areas of engineering and in other organizations of an administrative, production, operational or repair nature. Graduates have sufficient practical experience and skills in laboratory work that are compatible with European technical universities.

MECHANICAL ENGINEERING

(Field of study 2381 Mechanical Engineering)

The professional profile of graduates of the study programme Mechanical Engineering is characterised by theoretical and practical knowledge of constructology and mechanical engineering technologies, production facilities and automation, quality of mechanical engineering production, economics and production management, as well as habits and abilities to skilfully apply this knowledge in practice. Graduates acquired theoretical and practical knowledge of the most widespread technologies in mechanical engineering production and in the field of automation of mechanical engineering production. Graduates will acquire habits and skills in construction, design and technological activities, using modern technological tools. Graduates will acquire habits and skills in construction, design and technological activities, using modern technological means. Graduates also have basic knowledge in the field of production, testing, technological processing, selection, exploitation and degradation of the properties of the main types of technical materials. They are especially prepared to work in industrial companies in the field of production of technical materials, their technological processing into semi-finished products and products as well as in the field of quality control, purchase, sale, service and maintenance. Graduates are qualified to work in operation of industrial mechanical engineering companies, in railway and urban public transport, in all areas of mechanical engineering and in other organisations of administrative, production, operational or repair nature. Graduates have adequate knowledge and skills in the field of electronics, mechatronics, robotics, as well as in the field of computer-aided mechanical engineering production. They have 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 the operation of existing systems.