



FACULTY OF MECHANICAL ENGINEERING

TECHNICAL UNIVERSITY OF KOŠICE

SLOVAKIA



ANNUAL REPORT

2012



Technical University of Košice



Faculty of Mechanical Engineering

ANNUAL REPORT 2012



Editors:

Dr.h.c.mult.prof.Ing. František Trebuňa, CSc.
prof. Ing. Jozef Bocko, CSc.

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PREFACE

The Faculty of Mechanical Engineering confirmed its position of an important scientific - research institution during the last 60 years in the area of Slovak engineering. It offers the academic education in all three stages of the university study, namely in the full - time form and in the external form of study. Within the framework of the Faculty there are accredited 14 study programs of the bachelor's degree, 18 programs of the engineering (master's) degree and 12 programs of the PhD. - degree. In addition to this, the Faculty is also authorized to perform the habilitation - designating process, as well as to administer the professorship nomination in 12 scientific branches.

The main objective of the Faculty's scientific - research activities was stabilization of its position as a considerable scientific - research university workplace. The substantial part of these activities was oriented towards building of the excellent working compartments and laboratories.

The engineering is just the essential innovative kind of industry and it is the strategic branch at all levels – i.e. worldwide, in the EU area, in every country, for each region, in the individual companies, as well as at the technical universities.

Taking into consideration the real position of the Faculty of Mechanical Engineering it is possible to define the development strategy of the engineering orientation so that it is focused on the *perspective research and development* and also on the *preparing of the professionals – innovators*. The chosen areas of the advanced investigation and progress activities specified for the engineering are: the research and development of products, new technologies and production systems, as well as the research and development of human sources and social aspects.

The up - to - date mission of the Faculty consists in a realisation of the university education of future graduates in



the engineering area and in this manner to support also the intellectual and economical development of Slovakia. We have excellent and talented students. A perspective of their professional career and future position on the labour market are hopeful.

The scientific - research activity of the Faculty fulfils its strategic aim. It is based predominately on a solution of the projects that are integrated into the operational program Science and Research, grant projects and projects resulting from the real requirements of the technical and production practice. The solutions rising from these activities are implemented directly to the real applications and they are creating a potential, which is necessary for other related activities, especially for the publication outputs, registration of the inventions and for introduction of the scientific - research results into the practice.

The Faculty of Mechanical Engineering of the Technical University of Košice is successful also in acquiring of the projects financed by the structural funds. These projects are contracted in the total amount of approx. 8 millions EUR. The Faculty is prosperous in the projects VEGA, KEGA, APVV and in the foreign projects, as well. More than 50 projects from this area are involved in the solution process presently.



Many prestigious projects were realized in a close cooperation with the distinguished industrial companies, e.g. the U.S. Steel Košice, ZŤS VVÚ Košice, SPP Bratislava, Slovenské elektrárne, JAVYS Jaslovské Bohunice, etc. Our research and experimental laboratories are equipped with the top technology. We are disposing of apparatuses and equipment that are unique not only in Slovakia, but also in comparison to the world.

The mechanical engineering faculties are taking an irreplaceable role in the educational area of new professionals - innovators specified for the above - mentioned strategy. Their potential enables to realize the research and development activities, as well as to

educate the highly qualified experts. In order to improve an efficiency of the forenamed processes it is necessary:

- to implement changes at the universities more rapidly than we were accustomed usually,
- to accept an agreement concerning differentiation of activities among the individual faculties and research workplaces with regard to the requirements of the Slovak engineering diversification,
- to introduce new dimensions into the cooperation of the faculties with the industrial companies,
- to apply supporting stimuli taking into consideration a social importance of the engineering.

In Košice, the 28th January 2013

Dr.h.c. mult. prof. Ing. František Trebuňa, CSc.
Dean of the Faculty

MANAGEMENT OF THE FACULTY



Dr.h.c. mult. prof. Ing. František TREBUŇA, CSc.
DEAN OF THE FACULTY



Dr.h.c. prof. Ing. Miroslav BADIDA, PhD.
VICE - DEAN RESPONSIBLE
FOR DEVELOPMENT,
EVALUATION AND PROJECTS
COORDINATION



prof. Ing. Jozef BOCKO, CSc.
VICE - DEAN RESPONSIBLE
FOR SCIENTIFIC - RESEARCH
ACTIVITIES, FOREIGN RELATIONS
AND COOPERATION WITH
PRACTICE



prof. Ing. František GREŠKOVIČ, CSc.
VICE - DEAN RESPONSIBLE FOR
STUDY IN 2nd A 3rd DEGREE AND
INFORMATICS



prof. Ing. Ervín LUMNITZER, PhD.
CHAIRMAN OF ACADEMIC
SENATE



doc. Ing. Janette BREZINOVÁ, PhD.
VICE - DEAN RESPONSIBLE FOR
STUDY IN 1st DEGREE



Ing. Alžbeta ZAPACHOVÁ
SECRETARY OF THE FACULTY



SCIENTIFIC BOARD

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External members:

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Ing. Jaromír Jezný, PhD. – managing director, ZŤS VVÚ Košice

RNDr. Miroslav Kiral'varga, MBA – general manager, US Steel

JUDr. Ing. Jozef Konkoly – mayor of Kechnec

Ing. Tomáš Malatinský – minister of economy of Slovak republic

prof. Ing. Štefan Medvecký, PhD. – Sjf ŽU

prof. Dr. Ing. Oliver Moravčík – dean, MtF STU Bratislava

prof. Ing. Ľubomír Šooš, PhD. – dean, Sjf STU Bratislava

prof. Ing. Ján Vavro, PhD. – dean, FPT TnU AD in Trenčín



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Ing. Dávid Bogdan – student of 3rd level of study

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Employees:

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prof. Ing. Mikuláš Hajduk, PhD. – Department of Production Systems and Robotics

prof. Ing. Peter Horbaj, PhD. – Department of Power Engineering

prof. Ing. Jozef Kováč, CSc. – Department of Industrial Engineering and Management

prof. Ing. Hana Pačaiová, PhD. – Department of Safety and Quality Production

prof. Ing. Alexander Gmitterko, CSc. – Department of Applied Mechanics and Mechatronics

prof. RNDr. Martin Bača, CSc. – Department of Applied Mathematics and Informatics

doc. Ing. Ján Slota, PhD. – Department of Technologies and Materials

prof. Ing. Dušan Šimšík, PhD. – Department of Automation, Control and Human Machine Interactions

Students:

Ing. Branislav Duleba – student of 3rd level of study

Miroslava Bjalončíková – student of 2nd level of study

Radko Popovič – student of 2nd level of study

Denisa Chovancová – student of 2nd level of study

Miroslava Jamborová – student of 1st level of study



EDUCATION

Accreditation for:

Bachelor level

- 1) Automotive Production
- 2) Safety and Occupational Health Protection
- 3) Environmental Management
- 4) Quality of Production
- 5) Mechatronics
- 6) Computer Aided Engineering Production
- 7) Control and Diagnostics for Technology of Production, Robotics and Transport
- 8) Industrial Engineering
- 9) Prosthetics and Orthotics
- 10) Technology of Environment Protection
- 11) General Mechanical Engineering
- 12) Mechanical Engineering – new
- 13) Technology, Management and Innovation in Machinery Production – new
- 14) Management of Technical and Environmental Risks in Mechanical Engineering - new

Master (Engineer) level

- 1) Applied Mechanics
- 2) Automation and Control of Machines and Processes
- 3) Automotive Production
- 4) Safety of Technical Systems
- 5) Production Quality
- 6) Biomedical Engineering
- 7) Transport Machines and Logistics
- 8) Power Supply Machines and Machinery
- 9) Environmental Management
- 10) Mechatronics
- 11) Computer Aided Engineering Production
- 12) Industrial Engineering
- 13) Robotic Technology
- 14) Engineering Technologies
- 15) Machines and Machinery for Building Industry, Agriculture and Dressing
- 16) Mechanical Engineering
- 17) Technology of Environment Protection
- 18) Production Machines and Machinery



Doctoral study

- 1) Applied Mechanics
- 2) Automation and Control
- 3) Safety of Technical Systems and Safety of Work
- 4) Biomedical Engineering
- 5) Parts of Machines and Mechanisms
- 6) Transport Machines and Equipments
- 7) Power Supply Machines and Equipments
- 8) Mechatronics
- 9) Industrial Engineering
- 10) Engineering Technologies and Materials
- 11) Technology of Environmental Protection
- 12) Production Machines

Numbers of students

STUDY LEVEL	FULL - TIME STUDENTS	EXTERNAL STUDENTS	TOGETHER
BACHELOR	1243	183	1426
ENGINEER	640	246	886
DOCTORAL	70	80	150
			2462



HABILITATIONS AND INAUGURATIONS

Habilitations

Ing. Michal Fabian, PhD.

Thesis: CAD/CAM Systems at the Process of Design and Production of Transport Machine Components
Lecture: Surface Modeling at the Area of Shape Design in Automotive and Consumer Goods Industry

Ing. Jozef Svetlík, PhD.

Thesis: Contribution to Building of Production Machines on the Principles of Flexible Architecture
Lecture: Trends in Building of Machine Tools on the Basis of Modular Principles

Ing. Ján Viňáš, PhD.

Thesis: Possibilities of Renovations of Cylinders on Steel Continual Casting Lines by Welding
Lecture: Inspection Methods in Welding

Ing. Radovan Hudák, PhD.

Thesis: Diagnostics of Biomechanical Relations in Application of Special Orthoses
Lecture: Biomechanical Measurement of Contact Pressure in Prosthetics and Orthotics

Ing. Marek Sukop, PhD.

Thesis: Strategy of Control and Cooperation of Mobile Robot Group on the Basis of MAS Robosoccer
Lecture: Visual Camera Systems of Robots for Intelligent Manipulation

Ing. Tomáš Brestovič, PhD.

Thesis: Cooling and Filtration of Natural Gas in Compressor Stations
Lecture: Heat Transfer on Surfaces of Cooling Ribs

Inauguration

doc. Ing. Eva Zdravecká, CSc.

Lecture: Improvement of Tribological Properties of Mechanical Systems by Coatings and Layers

Celebration of the 60th anniversary of Faculty of Mechanical Engineering

The celebration of the 60th anniversary of the establishment of Faculty of Mechanical Engineering culminated on May 22.-24, 2012.



Salutation of Rector Dr.h.c. prof. Ing. Anton Čižmár, CSc.
and Dean Dr.h.c. mult. prof. Ing. František Trebuňa, CSc.



Dean of faculty receiving symbolic cheque for 1 300 000 €
from general manager of Siemens Slovensko - Ing. Vladimír Slezák



INSTITUTE OF SPECIAL TECHNICAL SCIENCES

- Department of Applied Mathematics
- Department of Applied Mechanics and Mechatronics
- Department of Biomedical Engineering and Measurement
- Department of Automation, Control and Human Machine Interaction



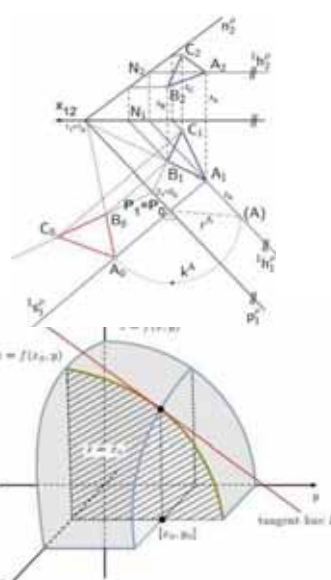


Department of Applied Mathematics and Informatics



Contact

The head: Knežo Dušan,
prof. RNDr., CSc.
E - mail: dusan.knezo@tuke.sk
Address: Letná 9, 041 87,
Košice, SR
Phone no.: +421 55 602 2451
Fax.: +421 55 602 2223



Staff

- Professors: **2**
- Assoc. Professors: **0**
- Assist. Professors: **7**
- Researchers: **0**
- PhD. Students: **0**

Activities at the department

Date	Title of the event, activity characterizing the life at the department in 2012
7/2012	The 7th International Workshop on Graph Labeling (IWOGL) 2012, Jakarta, Indonesia (prof. RNDr. Martin Bača, CSc.)
10/2012	Physics of Materials, scientific conference, Technical University of Košice (RNDr. Denisa Olešáková, PhD.)

LIST OF SUBJECTS GUARANTEED BY THE DEPARTMENT

Bachelor study

- ✓ Applied Mathematics Basics in Constructive and Computer Geometry
- ✓ Fundamentals of College Mathematics
- ✓ Mathematical Calculations Using MAPLE
- ✓ Mathematical Software
- ✓ Mathematics I.
- ✓ Mathematics II.
- ✓ Mathematics III.
- ✓ Mathematics IV.
- ✓ Numerical Methods
- ✓ Repetitorium in Mathematics
- ✓ Selected Chapters from Mathematics
- ✓ Seminary in Mathematics
- ✓ Statistical Methods
- ✓ Statistical Methods in Production
- ✓ Statistical Methods in Quality Management I.
- ✓ Statistical Methods in Quality Management II.
- ✓ Statistical Software
- ✓ Statistics for Environmentalists
- ✓ Theory of Probability

Master study

- ✓ Applied Mathematics
- ✓ Engineering Statistics
- ✓ Environment Statistics
- ✓ Mathematical Methods in Automatization
- ✓ Mathematical Modelling
- ✓ Mathematics I.
- ✓ Operational Analyses
- ✓ Statistical Data Processing of Environmental Information
- ✓ Statistical Methods
- ✓ Statistical Methods for Evaluation of Biological Signals
- ✓ Statistical Methods in Production

PhD. study

- ✓ Applied Mathematics
- ✓ Selected Chapters from Mathematics
- ✓ Mathematical Methods in Environmentalism

GRADUATE THESES

BACHELOR'S THESES:

Bérešová Gabriela	Control charts as a tool for quality management
Hoššo Stanislav	Statistical process control
Hužvárová Martina	Environmental education and management in practice
Lešková Ivana	The analysis capabilities of the manufacturing process
Nickelová Ivona	Statistical analysis of noise evaluation in work environment
Štrauch Peter	Magnetic materials based on FeNi (student PF UPJŠ)
Tomko Tomáš	Statistical inspection

MASTER'S THESES:

Bartko Ján	The statistical evaluation of air quality status in selected location
Bartók Ladislav	The statistical evaluation of water quality status in selected river
Falatová Martina	Comprehensive evaluation of selected locations from an environmental perspective
Germanová - Sobeková Katarína	Software tools of statistical quality control in the selected organization

Gmitro Milan	MSA application for measuring equipment
Goceliaková Mária	Methodology for the statistical evaluation of the inter - laboratory comparison in acoustics
Gregová Daniela	The use of quality management tools for the analysis of the production process errors
Nagyová Monika	Modernization of technological equipment for demineralized waste production in order to optimize production and increase safety in TEKO company
Nedoroščík Jaroslav	Reconstruction of Steam boiler PK - 4 in order to optimize production and increase the safety of technological equipment in TEKO company
Puliková - Hrehová Miroslava	Application SPC tools in practice
Richnavská Eva	The statistical analysis of separate waste collection in the selected location
Rimský Henrich	Evaluation capacity of the production process
Rošková Veronika	Evaluation and optimization of the production process with using statistical tools of quality management
Sabová Dominika	Modeling of difusion of leak solutions through the membranes
Zahurancová Bernadeta	The application of the statistical methods in the production quality control

RESEARCH AT THE DEPARTMENT

Area of research:

- ✓ Asymptotical properties of ordinary differential equations with distributed arguments.
- ✓ Application of mathematical methods in mechanics.
- ✓ Mathematical simulation in the area of biomedical engineering.
- ✓ Labellings and colourings of graphs.
- ✓ Metric dimension of graphs.
- ✓ Investigation of the soft magnetic materials and the simulation of mathematical model for calculation of the coercivity.
- ✓ The study of permeability dependence on the frequency and simulation of function by the mathematical models.
- ✓ The theoretical study of lattice Hamiltonians of the spin systems for zero and non - zero temperatures.
- ✓ Exactly soluble spin models on decorated lattices.
- ✓ Statistical processing control.
- ✓ Using statistical methods in environment.

Research characteristics:

The research of the department is oriented to the application of mathematical methods and statistical methods in the different areas, for example biomedical engineering, environment, mechanics, physics of materials and theoretical physics. The main fields of the mathematical disciplines at the department are differential equations, graph theory and mathematical calculations in theoretical physics.

Areas of expertises:

- ✓ Applied Statistics
- ✓ Condensed Matter Physics
- ✓ Discrete Mathematics
- ✓ Differential Equations
- ✓ Mathematical Modelling
- ✓ Theoretical and Statistical Physics

PROJECTS OF THE DEPARTMENT

Title of the project **Package of innovative features for education reform at TUKE**

Type of the project EU – OP Education
Number of the project ITMS code 26110230018; OPV - 2009/1.2/01 - SORO

Principal investigator prof. Ing. Pavel Raschman, CSc.

Time period of the project 2010 - 2013

Annotation of the project The main aims of the project are to achieve continuous adaptation of TUKE for current and future needs of the knowledge society using innovation and quality education, to support career development of TUKE teachers, focusing on improving the quality of education, to support improvement of the education quality and human resource development in all areas of research and development at TUKE.

Title of the project **Center for research of control of technical, environmental and human risks for permanent development of production and products in mechanical engineering**

Type of the project EU – OP Research and Development
Number of the project ITMS code 26220120060; OPVaV - 2009/2.1/03 - SORO

Principal investigator Dr.h.c. prof. Ing. Miroslav Badida, PhD.

Time period of the project 2010 - 2013

Annotation of the project In the present the existing database represents large amount of knowledge, experience and information that refer to objectification and estimation of environmental factors. There were gained theoretical knowledge by realized research, and also experience pursuant to which we can create basics of knowledge. There are many experienced workers at workplace, who are specialists in particular specific areas of environment and working environment, whose actual experience and theoretical knowledge represents high entry value of project and guarantee not only creating of quality knowledge basis in the research process, but also knowledge centre. Gained information will create knowledge basis for

objectification of environmental factors, which will be implemented during creating of situational models of environmental risk in industrial workplaces.

To achieve these activities, we need to harmonize with legislative requirements and therefore it is necessary in frame of this activity to obtain normative literature, methodical operations, and technical foreign and home literature.

NATIONAL PROJECTS

Title of the project **Problems in labelling and coloring of graphs**

Type of the project Grant project VEGA

Number of the project 1/0130/12

Principal investigator prof. RNDr. Martin Bača, CSc.

Time period of the project 2012 - 2014

Annotation of the project The project deals with problems in labeling and coloring of graphs. The main goal of the project is to construct alpha - labeling (a special type of graceful labeling) of trees from graceful labelings of smaller trees and use a relationship among alpha - labelings and edge - antimagic labelings for obtaining edge - antimagic total labelings of trees. We will use a relationship between edges - antimagic labelings and face - antimagic labelings for describing d - antimagic labelings of plane graphs. We will study the Thue indices of the non - repetitive list colourings of graphs focusing on plane graphs.

Title of the project **The influence of interaction of ferromagnetic iron based particles on the magnetic properties of composite materials**

Type of the project Grant project VEGA

Number of the project 1/0861/12

Principal investigator prof. RNDr. Peter Kollár, CSc.

Time period of the project 2012 - 2015

Annotation of the project The project is focused on experimental study of the structure and magnetic properties of advanced materials with heterogeneous structure consisting of ferromagnetic particles based on iron embedded in magnetically active or inactive matrix which insulates ferromagnetic particles (organic binders, ferrite and silica). The particles with the size of 2 nm - 0.1 µm have amorphous, nano - or microcrystalline structure. The particles with size of 2 nm - 100 nm will be prepared by chemical methods: nanocasting method or by the reverse micelle method and larger particles by mechanical milling. The study will be focused on the explanation of the influence of the

interaction of these particles on their magnetic properties under various physical conditions (temperature and magnetization method). Expected results should further expand the application potential of the advanced materials for recording media with high density and soft magnetic materials suitable for application at frequencies above 20 kHz, where are ferrites used.

Title of the project	The study of the influence of ferromagnet and insulator parameters on the magnetic properties of composite materials for electrical technology
Type of the project	Grant project VEGA
Number of the project	1/0862/12
Principal investigator	RNDr. Ján Fúzer, PhD.
Time period of the project	2012 - 2014
Annotation of the project	The project is focused on the determination the magneto - structural correlations in soft magnetic composites. Powders covered via chemical procedure will be hot compacted to obtain a ring composite material. Along with classical methods of measurements of magnetic properties and structural analysis and non - conventional methods which provide information on electromagnetic interactions between particles will be employed. In particular, the study of complex permeability and also analytical methods for determination of parts of magnetic losses will be adopted. The main goal is to determine mutual relation between magnetic parameters and the size of particles and the thickness of insulation layer. The next contribution to the explanation of these materials will extend their application potential. The outcomes of the project will be in the form of scientific publications and presentations at scientific conferences but their application within all levels of university education is also envisaged.

VISITS OF STAFF MEMBERS TO FOREIGN INSTITUTIONS

Employees and students	Country
Bača Martin, prof. RNDr., CSc.	Pakistan (25.4. - 1.6.2012; 12.11. - 7.12.2012)
Bača Martin, prof. RNDr., CSc.	Indonesia (22.7.2012 – 1.8. 2012)
Feňovčíková Andrea, RNDr., PhD.	Australia (1.2. 2012 - 30.3. 2012)

MEMBERSHIP IN SLOVAK PROFESSIONAL ORGANISATIONS

Union of Slovak Mathematicians and Physicists

Mirian Andrejiová, RNDr., PhD.
 Martin Bača, prof. RNDr., CSc.
 Andrea Feňovčíková, RNDr., PhD.
 Jana Füzervová, RNDr., PhD.
 Lucia Gálisová, RNDr. PhD.
 Gabriela Ižaríková, RNDr., PhD.
 Zuzana Kimáková, RNDr., PhD.
 Dušan Knežo, prof. RNDr., CSc.
 Denisa Olekšáková, RNDr., PhD.

Slovak Physical Society

Jana Füzervová, RNDr., PhD.
 Denisa Olekšáková, RNDr., PhD.

Slovak Mathematical Society

Martin Bača, prof. RNDr., CSc.
 Andrea Feňovčíková, RNDr., PhD.

PUBLICATIONS

Journals

- [1] FÜZERVÁ, Jana - FÜZER, Ján - KOLLÁR, Peter - HEGEDÜS, Lukáš - BUREŠ, Radovan - FÁBEROVÁ, Mária.: **Analysis of the Complex Permeability Versus Frequency of Soft Magnetic Composites Consisting of Iron and Fe73Cu1Nb3Si16B7**. In: IEEE Transactions on Magnetics. Vol. 48 (2012), p. 1545 - 1548. ISSN 0018 - 9464
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- [11] BAČA, Martin - SHABBIR, Ayesha: **Total labelings of toroidal polyhexes**. In: Science International. Vol. 24 (2012), p. 239 - 241. ISSN 1013 - 5316
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- [13] PIŇOSOVÁ, Miriama - ANDREJIOVÁ, Miriam - LUMNITZER, Ervin: **Analýza klinických príznakov synergie pôsobenia hluku a vibrácií na zdravie človeka v prevádzkach s ich vysokou expozíciou**. In: Pracovní lékařství. Vol. 64 (2012), p. 103 - 111. ISSN 0032 - 6291
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Department of Applied Mechanics and Mechatronics



Contact

The head: Trebuňa František,
Dr.h.c. mult. prof. Ing., CSc.
E - mail: frantisek.trebuna@tuke.sk
Address: Letná 9, 042 00 Košice, SR
Phone no.: +421 55 602 2462
Fax.: +421 55 602 2462



Staff

- Professors: **5**
- Assoc. Professors: **3**
- Assist. Professors: **9**
- Researchers: **3**
- PhD. Students: **9 internal, 5 external**

Activities at the department

Date	Title of the event, activity characterizing the life at the department in 2012
5/2012	Department's competition of student scientific and technical activities.
11/2012	5th International Conference Modelling of Mechanics and Mechatronics systems.

EDUCATION AT THE DEPARTMENT

STUDY PROGRAMS

Bachelor's degree:

- Mechanical Engineering
- Mechatronics

PhD. degree:

- Applied Mechanics
- Mechatronics

Master's degree:

- Mechanical Engineering
- Applied Mechanics
- Mechatronics

Number of the students

(till 30. 10.2012) on the study programs guaranteed by the department:

first year of bachelor study:

- 126 internal form of study
- 12 external form of study

second year of bachelor study:

- 62 internal form of study
- 20 external form of study

third year of bachelor study:

- 46 internal form of study
- 10 external form of study

first year of engineer study:

- 25 internal form of study

second year of engineer study:

- 18 internal form of study

Number of the graduates (2011/2012)

on the study programs guaranteed by the department:

- 14 PhD. students in the internal form of study (defended PhD. thesis)

GRADUATE PROFILE

BACHELOR'S PROGRAMS (Bc.)

Mechanical Engineering

Students of this program will obtain knowledge from the theory of the mechanical systems and from their application in computation, constructional and technologic problems. Students will know to design, develop, implement, expand and operate modern mechanical devices and they can cooperate with managers and specialists from other professions. Students will obtain also theoretic and methodical knowledge

from the areas related to the engineering and machines, they will their skills improve in using of the CAD systems, they will introduce the economy rules, organisation and business activities in area of mechanical production. Students will obtain practical experiences, abilities and skills from working in area of construction and making of document of the mechanical systems, they will be able to effectively work as the member of the research and production team with adequate knowledge in professional, organisation and management area.

Mechatronics

Study field is focused on preparing of specialist in area of mechanical - electrical engineering with knowledge of basics from area of informatics, automation, diagnostic etc. It is focused on machines, devices and systems with high added value of functionality, movement and manipulation ability, which are controlled with modern automation and computer techniques, digital distributed control systems etc. Mechatronics is sensed as interdisciplinary scientific field, which deals with computer controlled electromechanical systems. Subsystems of microcomputer controlling and regulation in real time with high flexibility and reliability are non - separable part of them.

MASTER'S PROGRAMS (Ing.)

Mechanical Engineering

Students of this study program will be able to analyze, design, construct, and review large engineering devices and they will be able to provide research with high creativity and self - activity. Students will obtain detailed knowledge from area of the mechanical engineering, which gives them ability to manage work teams in this area. They will be able to self - employed lead of projects and takeover liability for complex solutions. Students will be able to work with using of scientific approaches, because they will have experiences with formulation of hypothesis, with design of experiment, hypothesis verification and analyzing of obtained data.

Applied Mechanics

Students of this study program will have deepened knowledge from area of solid - state mechanics and compliant body mechanics. They will be able to do dynamic and strength analysis of complicated mechanical devices, and they will be able to use modern software (ADAMS, ANSYS, MATLAB, AUTOCAD etc.), in modelling and simulation process. Obtained knowledge from area of solid state and compliant bodies and environments allows them to self - employed lead of projects in area of mechanical devices development. They will be able to analyze design and construct large engineering solutions including mechanical systems and they will know to provide research with high creativity and self - activity.

Mechatronics

Study program mechatronics focuses to training of experts in area of electro - mechanical systems with knowledge of engineering informatics and automation for solution of engineering tasks coupled with complex system design, testing, production and operation of mechatronics systems controlled via distributed computer systems. There are many tasks as design, construction and projection of machines, machine devices and systems with high functional, movement and

manipulation abilities and mechanical accuracy, which have been controlled via modern automation and computer devices with application of artificial intelligence parts. Students will be able to analyze, design, construct large engineering solutions included mechatronic systems and they will be able to do research with high creativity and self - activity.

PhD. PROGRAMS (PhD.)

Applied mechanics

Study in this program is focused on training of high - specialized scientist for research, development and practise in all disciplines and workplaces, where is applied scientific knowledge of mechanics. Their scientific erudition is focused mainly into these areas of mechanics: development and improvement of the analytical and numerical computing methods (finite element method, method of boundary elements, mesh less methods), theory of the modelling and analysis of the mechanical systems and construction, constitution relation with impact onto linear and nonlinear behaviour of material, condition of the marginal state of the materials and bodies, mechanics of composites, smart and MEMS materials, analysis of the stress, analysis of the coupled deformation and dynamic response of selected body classes included combined bodies, inverse tasks of the mechanics and deformation of selected technologic processes, optimalization and contact tasks, interaction of constructions and environment, expert systems, mechanics of the micro and nano - systems, dynamics of the vehicles and machine devices.

Mechatronics

Students know scientific method of the research and development of the mechatronics products. Study focuses into solution of the scientific engineering problems in areas of the mechatronics, electronics, electrical engineering, mechanics and mechanical engineering, informatics and automatic control to the level of the artificial intelligence. The main assumption of the successful study is student ability of abstract thinking, their interest and ability to apply knowledge of these fields in solutions of engineering problems. Students have to know modern analytic and numerical methods and method of math modelling. Students will learn to characterize and to sense physic phenomena and experimental knowledge about these phenomena. Next, they will learn to find adequate models and new applications in specific disciplines, in science, in research and practice. Students will obtain theoretic knowledge and practical experience with the scientific work, they will be trained for self - employed scientific work in areas which cooperates with electrical engineering, mechanical engineering, informatics, automation and control, measurement engineering and sensing engineering.

LIST OF SUBJECTS GUARANTEED BY THE DEPARTMENT

Mechatronics (Bachelor study)

- ✓ Bachelor Thesis
- ✓ Basic of Precision Mechanics II.
- ✓ CAD
- ✓ Computer Mechanics I.
- ✓ Computer Mechanics II.
- ✓ Computer Modelling of Dynamics Systems
- ✓ Design and Modelling of Precision Mechanisms
- ✓ Dynamics
- ✓ Elasticity and Strength I.
- ✓ Final Project
- ✓ Geometrically and Physically Nonlinear Mechanics
- ✓ History of Sciences
- ✓ Kinematics
- ✓ Measurement of Non - electrical Quantities
- ✓ Mechatronics Systems
- ✓ Microprocessor Systems
- ✓ Statics
- ✓ Term Project
- ✓ Vibration of Mechanical Systems

Mechanical engineering (Bachelor study)

- ✓ Bachelor Thesis
- ✓ Basic of Modelling of Mechanical Systems
- ✓ CAD
- ✓ Computer Mechanics
- ✓ Computer Modelling of Dynamics systems
- ✓ Dynamics
- ✓ Elasticity and Strength I.
- ✓ Elasticity and Strength II.
- ✓ Final Project
- ✓ Geometrically and Physically Nonlinear Mechanics
- ✓ History of Sciences
- ✓ Kinematics
- ✓ Measurement of Non - electrical quantities
- ✓ Microprocessor Systems
- ✓ Statics
- ✓ Term Project
- ✓ Vibration of Mechanical Systems

Safety and health protection in work (Bachelor study)

- ✓ Elasticity and Strength
- ✓ Technical Mechanics

Information systems in mechanical engineering production (Bachelor study)

- ✓ Technical Mechanics I.
- ✓ Technical Mechanics II.
- ✓ Elasticity and Strength

Management and economic of production (Bachelor study)

- ✓ Technical Mechanics
- ✓ Elasticity and Strength

Maintenance of machines and devices (Bachelor study)

- ✓ History of Science
- ✓ Kinematics
- ✓ Statics
- ✓ Dynamics
- ✓ Elasticity and Strength II.
- ✓ Elasticity and Strength I.

Technique for safekeeping of environment (Bachelor study)

- ✓ Technical Mechanics

Applied mechanics (Master study)

- ✓ Diplom Project
- ✓ Thermal Stresses
- ✓ Kinematics and Dynamics of Coupled Dynamic Systems
- ✓ Limit States of Construction
- ✓ Master Thesis
- ✓ Noise and Vibration
- ✓ Nonlinear Mechanics and Mechanics of Continuum
- ✓ Numerical Methods of Mechanics I.

- ✓ Numerical Methods of Mechanics II.
- ✓ Plasticity and Creep
- ✓ Stochastic Mechanics
- ✓ Term Project
- ✓ Theoretic Mechanics
- ✓ Theory of Dynamic Systems
- ✓ Theory of Elasticity

- ✓ Theory of Engineering Experiment
- ✓ Theory of Mechatronic Systems, Modelling, Designing and Optimization
- ✓ Thin - walled Structures
- ✓ Vibration of Mechanical Systems

Mechanical engineering (Master study)

- ✓ Applied Mechanics
- ✓ Construction of Processing Devices
- ✓ Diplom Project
- ✓ Master Thesis
- ✓ Mechatronics

- ✓ Numerical Methods of Mechanics
- ✓ Term Project
- ✓ Theory of Dynamic Systems
- ✓ Theory of Engineering Experiments

Automation and control of machines and processes (Master study)

- ✓ Theory of Engineering Experiments

- ✓ Mechatronic Systems

Biomedical engineering (Master study)

- ✓ Mechatronics for Biomedical Engineering

Transport systems and logistic (Master study)

- ✓ Building Mechanics

- ✓ Numerical Methods of Mechanics

Mechatronics (Master study)

- ✓ Computer Aided Design of Mechatronic Systems
- ✓ Control of Engineering Systems
- ✓ Controlled Vibration
- ✓ Diplom Project
- ✓ Dynamics Rotors
- ✓ Electromechanical Systems
- ✓ Master Thesis
- ✓ Measurements in Mechatronics
- ✓ Mechanics of Composites Materials
- ✓ Mechatronics I.

- ✓ Mechatronics II.
- ✓ Microprocessor Systems
- ✓ Numerical Methods of Mechanics I.
- ✓ Optimization of Mechatronic Systems
- ✓ Term Project I.
- ✓ Term Project I.
- ✓ Theory of dynamic systems
- ✓ Theory of engineering experiment
- ✓ Theory of Systems for Modelling and Designing
- ✓ Training Exercises

Materials of utility coating (Master study)

- ✓ Finite Element Method

Robotic systems (Master study)

- ✓ Mechanics of Robots

Processing of plastic (Master study)

- ✓ Degradation Processes and Life Prediction

- ✓ Finite Element Method

Production machines and devices (Master study)

- ✓ Numerical Methods of Mechanics and Production Machines

GRADUATE THESES

BACHELOR'S THESES:

Kičák František	Application MSC Adams/View in kinematic analysis of centric crank mechanism
Bencková Anna	Stress analysis in the ring wheel of railway carriage after pressing - on
Bikár Róbert	Calibration of measurement equipment for length measurement.
Brajer Jakub	Analytical solution of simultaneous movements of piston pump with swinging cylinder and computer simulation in program MSC Adams View
Brenkus Metod	Dimensioning of water reservoir and piping
Bugajský Róbert	Analysis of heat transfer by FEM
Čierniková Michaela	Design of supporting structure of robotic arms
Čigáš Viliam	Reduction of residual stresses in machine parts and possibilities of their identification
Colville Daniel John	Locomotion of the linefollowing robot
Firmentová Hilda	Computation of eigenfrequencies and eigenshapes of cylindrical shells by FEM
Frimmer Michal	Dynamic of machine tool drive
Gaži Martin	Dynamic analysis of the differential mechanism of the car
Gbúr Marek	The application of digital image correlation method in motion analysis
Grieš Maroš	Application MSC Adams/View in kinematic analysis of mass point movement along a curve with and without resistance force
Gurega Miroslav	The structural design of module for a school robot
Harsányi Richard	Design of a modular chassis of service robot for work in rugged terrain
Hasara Igor	Using of finite element method for stress analysis of pallet for burnt products
Hlopko Lukáš	Dynamic analysis of six - axis industrial robot in SolidWorks/COSMOSMotion
Hvižd'ak Martin	Dynamic analysis of ski lift drive
Jančoška Lukáš	Neuron net for navigation of mobile robot
Javor Lukáš	Modelling of four - wheeled nonholonomic robot
Keczer Matúš	Utilization of Q - 450 system in the creation of a finite element model
Kertész Tomáš	Coordinate measurement on CMM with contacting probing system

Kišel'ová Katarína	Experimental stress analysis of beam bending stress by optical methods
Kostka Ján	Optical methods and their application in industrial practice
Kovalčík Ján	Supporting elements of structures and their stress spectra
Kuffa Marek	Mathematical modeling and computer simulation of dynamic system with one degree of freedom
Kula Tomáš	Optimization of carrying members of lifting gear
Líška Dávid	Modelling of two - wheeled car - like robot with difference drive
Lisy Lukáš	Kinematical analysis of six - membered mechanism by MSC Adams/View
Marečák Boris	Dynamic analysis of wheeled service robot in SolidWorks/COSMOSMotion
Mihálik Alexander	Using of finite elements in stress analysis of a lawnmower blade
Mudroň Martin	Dynamic analysis of mechanical system of material hoist
Nestorovič Peter	The study of a service robot chassis for the movement in an unknown environment
Pipík Tomáš	Design of robot model with ability to work in dissected terrain
Poláček Matej	Mechanism design of diamagnetism levitation object positioning
Puzderová Anna	Design of teaching aid for stability analysis of straight bars
Rákay Róbert	Kinematical analysis of four - membered mechanism by MSC Adams/View
Siheľský Dárius	Reflection polariscopes and their using in quantification of principal normal stresses
Šimšaj Daniel	Conception design of the two legged robot
Škuta Michal	Modelling of antiblocking brake system of a car
Štofanič Erik	Analysis of high deformations of elastic members by methods of elastic
Štolc Martin	Strength analysis of structural point
Šubová Lýdia	Experimental vibration analysis of mechanical element by optical methods
Szívos Gabriel	Using of optical methods in stress analysis of beam of constant strength and variable height
Tušek Ľuboš	Dimensioning of lifting jack
Urbančok Marek	Strength computation of rail wheel of mobile mechanism
Varga Martin	Movement modelling of diver robot
Vincová Mária	Options for lifetime improvement of mechanical parts
Zbornáková Jana	The application of PSCalc software in stress analysis using PhotoStress method

MASTER'S THESES:

Balogh Karol	Antiskid brake system simulation.
Barbarič Maroš	Design of a components parametric model for elevator cabs
Budziňák Mikuláš	The structural design of effector for handling agricultural crops
Farkašovský Michal	Loading simulation of telescopic crane boom
Haiser Martin	Using of optical method in experimental analysis of mechanical system
Herceg Matúš	Analysis of stresses and deformations of telescopic crane boom
Koščák Martin	Chassis design for movement of the robot in the living space
Kurimský Radovan	Reanalysis methods and their using in structural mechanics
Menda František	Design of the conception for contact - less control of air knives with drives for zincify production line no. 3
Meteňko Peter	Design of the robotic hand
Oeser Lukáš	Using of ESPI method in full - field deformation analys
Oravec Peter	Two - wheeled pendulum robot mechanical design
Orečný Martin	Simulation of drop test of container for transportation of nuclear waste
Salovka Tomáš	Design of puck collecting robot
Skurkay Roman	Using of FEM to strength analysis of silage container
Uljan Branislav	Adaptable wheeled vehicle for locomotion on rough terrain
Urda Lukáš	Microcontroller basic atom for data processing of the sensor signal in mechatronic systems.
Vyrostko Vladimír	Design of the personal vehicle with electrical drives

PhD. THESES:

Binda Michal	Using of experimental methods for modal analysis of mechanical systems
Jezný Jaromír	Solution of selected problems mobile teleoperators
Masláková Kristína	Identification and quantification of influence of residual stresses on technical life for elements and systems by using Ring - core method
Štamborská Michaela	Identification and quantification of plastic deformation using digital image correlation
Vacková Martina	Geometrical and mass limit values assessment of mobile wheeled pendulum from viewpoint fundamental limitation in control
Virgala Ivan	Design of technical system to imitate a snake motion

RESEARCH AT THE DEPARTMENT

Area of research:

- ✓ Development of non - traditional experimental methods for mechanical and mechatronic systems.
- ✓ Development of computer methods and algorithms for numerical simulation and optimisation of systems.
- ✓ Methods of experimental and numerical modelling of mechatronic systems
- ✓ Using of experimental methods for development of methodology for identification and prediction of failures in supporting elements of mechanical systems.
- ✓ Stochastic processes and limit states of mechanical systems.
- ✓ Development, verification and using of modern experimental methods of mechanics.
- ✓ Design and realisation of mechatronic systems, realisation of automatic controlled systems, measurement, data acquisition and their evaluation.
- ✓ Numerical modelling of mechatronic systems.
- ✓ Research of modules for intelligent robotic systems.
- ✓ Complex modular robotic system of mid category with higher intelligence.

PROJECTS OF THE DEPARTMENT

Title of the project	Using of methods of experimental and numerical modelling for increasing of competitiveness and innovation of mechanical and mechatronics systems
Type of the project	APVV – applied research and development
Number of the project	APVV - 0091 - 11
Principal investigator	Dr.h.c. mult. prof. Ing. František Trebuňa, CSc.
Time period of the project	07/2012 - 12/2015
Annotation of the project	Methods of experimental and numerical modelling of mechatronic systems are significant part of acceleration of product design with substantially shorter time of introduction of product into production and on market. They support reduction of errors, more powerful and sophisticated products with high added value. They have nowadays important position not only in research and development, but also in technology of their production. With respect to current equipment of solution workplace by devices, hardware and software as well as personal, it is possible to transform all important results gained in laboratories into applications in specific individual products and accordingly support sector with high added value. In Slovakia and all around the world the big attention is devoted

to questions of numerical modelling. The workplace of applicants has all knowledge resulting from base research and increase competitiveness of machine production and products. There will use methods of experimental modelling, especially interferential methods based on image correlation, Photostress method, method ESPI, methods of modal analysis.

In the frame of project solution these methods will be used in design of metamorphic robots and robotic systems that will have ability of flexible reconfiguration of its own kinematical and functional structure and they are designed on workplace of applicants.

Title of the project **Centre for research of control of technical, environmental and human risks for permanent development of production and products in mechanical engineering**

Type of the project EU - OP Research and development 2620002
Number of the project ITMS: 26220120060; OPVaV - 2009/2.1/03 - SORO

Principal investigator Dr.h.c. mult. prof. Ing. František Trebuňa, CSc.

Time period of the project 2010 - 2013

Annotation of the project Project is primary focused to research of control of technical, environmental and humane risk, what is directly connected with safekeeping of life environment. Modern measurement technique will enables prevention and elimination of technical and also safety and environmental risks of mechanical producing processes, as well as resulting products in several phases of their life.

Title of the project **Research of modules for intelligent robotic systems**

Type of the project EU - OP Research and development 2620002
Number of the project ITMS: 26220220141; OPVaV - 2009/2.2/05 - SORO.

Principal investigator prof. Ing. František Šimčák, CSc.

Time period of the project 01/2011 - 12/2014

Annotation of the project Element design of experimental chain and software for numerical modelling, buying of them, building of measurement chain for tensometer system, equipment of hardware chain, developing of professional program products with possibility of using of above mentioned systems. Enhancement of measurement possibilities and stresses evaluation, residual life and verification of measured data with other methods including of natural frequency identification and other dynamical properties of system.

Title of the project	Complex modular robotic system of mid category with higher intelligence
Type of the project	Stimulus – Project of applied research
Number of the project	1/0006/11
Principal investigator	Dr.h.c. mult. prof. Ing. František Trebuňa, CSc.
Time period of the project	09/2010 - 08/2013
Annotation of the project	Design and developing of modular robotic systems with higher intelligence to adapt and change its properties in accordance to changed environment conditions. Project is focused to robotic used also in dangerous areas, where people cannot operate directly, but through these robotics systems.
Title of the project	Using of experimental methods for development of methodology for identification and prediction of failures in supporting elements of mechanical systems
Type of the project	VEGA
Number of the project	VEGA 1/0289/11
Principal investigator	prof. Ing. František Šimčák, CSc.
Time period of the project	2011 - 2013
Annotation of the project	Using of experimental methods of mechanics for development of new methodology for identification and prediction of failures in supporting elements of mechanical systems with the aim to evaluation of residual life span of machines and equipments. Development and application of new treatments in the area of strain - gage measurement, photoelasticimetry, digital image correlation and vibrodiagnostic with using of top - level measurement equipments and up to date software.
Title of the project	Numerical modelling of mechatronic systems
Type of the project	VEGA
Number of the project	VEGA 1/1205/12
Principal investigator	prof. Ing. Jozef Bocko, CSc.
Time period of the project	2012 - 2015
Annotation of the project	The aim of the project is creation of numerical models of mechatronics systems with a specific application. This is concerned to simulation of snake - like robot locomotion when it moves through narrow unstructured passages for purpose to perform a task such as maintenance inside pipes. The snake - like robot utilize concertina snake gait which is the most

suitable for this activity in both horizontal concertina motion and vertical concertina motion. The mathematical model for numerical simulation is based on the framework of non - smooth dynamics. Moreover, the mathematical and simulation model of the snake - like robot for concertina gait is created for purpose of controller design described by an ordinary differential equation. In terms of project experimental function model of snake - like robot on the basis of theoretical knowledge for purpose comparison with numerical model will be created.

Title of the project	Development of non - traditional experimental methods for mechanical and mechatronic systems
Type of the project	VEGA
Number of the project	VEGA 1/0937/12
Principal investigator	Dr.h.c. mult. prof. Ing. František Trebuňa, CSc.
Time period of the project	2012 - 2015
Annotation of the project	Development of non - traditional experimental treatments of deformation and stress analysis in supporting elements of mechanical and mechatronic systems with privileged orientation to optical methods – digital image correlation (DIC), electronic speckle interferometry (ESPI) and reflection photoelasticity (Photostress). Precising and enhancement of residual stress measurement and evaluation. Application of optical methods of stress fields determination in vicinity of measured point. Verification of new - developed methods of lifespan and reliability evaluation of machine and equipment design as well as design of mechanical and mechatronic systems.
Title of the project	Influence of imperfections on resistance of structural members and load - bearing structures of machines
Type of the project	VEGA
Number of the project	VEGA 1/0090/12
Principal investigator	doc. Ing. Vladimír Ivančo, CSc.
Time period of the project	2012 - 2015
Annotation of the project	The project is focused on study of influence of imperfections on resistance of structural members of thin - walled structures. Various methods of modelling of imperfections are examined and the measure of imperfection effect is determined.

VISITS OF STAFF MEMBERS TO FOREIGN INSTITUTIONS

Employees and students

Gmiterko Alexander, prof. Ing., PhD.

Kelemen Michal, doc. Ing., PhD.

Surovec Róbert, Ing.

Vacková Martina, Ing.

Virgala Ivan, Ing.

Masláková Kristína, Ing.

Binda Michal, Ing.

Kalina Matúš, Ing.

Country

University of Miskolc, Hungary

University of Miskolc, Hungary

University of Miskolc, Hungary

VŠB TO Ostrava, FS, CZ

VUT Brno, CZ

VUT Brno, CZ

VUT Brno, CZ

VŠB TU Ostrava, FS, CZ

VISITS OF STAFF MEMBERS FROM FOREIGN INSTITUTIONS

Employees and students Country

Vaño Jaime Masiá

Polytechnic university of Valencia, Spain

Sanchis Ernesto Juliá

Polytechnic university of Valencia, Spain

Peguet Jonathan

Clermont - Ferrand University, France

Moškin Sergej, Ing.

Siberian state industrial university, Russia

Gnezdilov Viktor, Ing.

Siberian state industrial university, Russia

MEMBERSHIP IN SLOVAK PROFESSIONAL ORGANISATIONS

Member of Editorial Committee of Home Journals

František Trebuňa, Dr.h.c. mult. prof. Ing., CSc.

Czech and Slovak Association for Mechanics

František Trebuňa, Dr.h.c. mult. prof. Ing., CSc.

Association of Slovak Mechanical Engineers

František Trebuňa, Dr.h.c. mult. prof. Ing., CSc.

Slovak Association for Mechanics

František Trebuňa, Dr.h.c. mult. prof. Ing., CSc., František Šimčák, prof. Ing., CSc., Jozef Bocko, prof. Ing., CSc., Ingrid Delyová, Ing., PhD., Peter Frankovský, Ing., PhD., Róbert Huňady, Ing., PhD., Miroslav Pástor, Ing., PhD.

MEMBERSHIP IN INTERNATIONAL PROFESSIONAL ORGANISATIONS

Dr.h.c. mult. prof. Ing. František Trebuňa, CSc.:

Guest editor and co - ordinating the submission of special issue of Procedia Engineering Journal by Elsevier, Ltd., Volume: 48/2012, Topic: Modelling of Mechanical and Mechatronic Systems. ISSN 1877 - 7058.

Member of Editorial Committee of Foreign Journals

František Trebuňa, Dr.h.c. mult. prof. Ing., CSc.

New York Academy of Sciences

František Trebuňa, Dr.h.c. mult. prof. Ing., CSc.

IEEE Institute of Electrical and Electronics Engineers

Alexander Gmitterko, prof. Ing., PhD.

Technical Scientific Committee IMEKO Technical Mechanics

František Trebuňa, Dr.h.c. mult. prof. Ing., CSc.

International Biographical Centre Cambridge, England

František Trebuňa, Dr.h.c. mult. prof. Ing., CSc.

PUBLICATION

Books:

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Research reports:

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Department of Biomedical Engineering and Measurement



Contact

The head: Živčák Jozef, Dr.h.c. prof.
Ing., PhD.
E - mail: jozef.zivcak@tuke.sk
Address: Letná 9, 042 00 Košice, SR
Phone no.: +421 55 602 2381



Staff

- Professors: 2
- Assoc. Professors: 1
- Assist. Professors: 3
- Researchers: 5
- PhD. Students: 3

Activities at the department

Date	Title of the event, activity characterizing the life at the department in 2012
3/2012	Training in coordinate metrology (ESF Project)
6 - 7/2012	Training in coordinate metrology (ESF Project)

EDUCATION AT THE DEPARTMENT

STUDY PROGRAMS

Bachelor's degree:

- Prosthetics and Orthotics

PhD. degree:

- Biomedical engineering

Master's degree:

- Biomedical engineering

Number of the students (till 30. 06. 2012),

on the study programs guaranteed by department: 94

Number of the graduates (2011/2012),
on the study programs guaranteed by the department: 32

GRADUATE PROFILE

BACHELOR'S PROGRAMS (Bc.)

Prosthetics and Orthotics

The priority target of study program Prosthetics and Orthotics is preparation of university qualified medical workers, who are allowed, within health and rehabilitation care on the indication base of doctor, to design and repair orthotics and prosthetics equipment in whole range of biomedical engineering. This worker will be able to effectively collaborate with medical or non - medical workers in area of health and rehabilitation care.

MASTER'S PROGRAMS (Ing.)

Biomedical Engineering

The aim of the study is to realize theoretical knowledge and practical experiences in such an amount, to have absolvent as independent working partner in engineering and medical process:

- for application of actual technical, mathematical and physical knowledge about new biomedical and instrumental techniques,
- in the area of research, development and utilization of the automatic and biomedical systems for the decision features support.

PhD. PROGRAMS (PhD.)

Biomedical Engineering

Doctoral program is focused on deepening and extension of theoretical knowledge gained in the previous study, to learn the scientific working methods and experimental habits and skills needed for scientific work in the biomedical engineering.

LIST OF SUBJECTS GUARANTEED BY THE DEPARTMENT

- ✓ Architecture of Prosthetic and Orthotic Resources
- ✓ Basics of Biomedical Engineering
- ✓ Basics of Clinical Prosthetics and Orthotics
- ✓ Basics of Law
- ✓ Basics of Rehabilitation Engineering
- ✓ Biocybernetics
- ✓ Biomaterials
- ✓ Biomeasurement
- ✓ Biomechanics in Prosthetics and Orthotics
- ✓ Biomechanisms
- ✓ Biomedical Engineering I.
- ✓ Biomedical Engineering II.
- ✓ Calceotics
- ✓ Clinical Investigations Technics
- ✓ Courses of Social Science
- ✓ Diploma Project
- ✓ Diploma Project (DP)
- ✓ Elements of Anatomy and Physiology
- ✓ Ergonomic and Kinesiology Measurements
- ✓ Ergonomics Measurements
- ✓ Ethics in Medicine
- ✓ Final Project
- ✓ Final Work
- ✓ Functional Anatomy
- ✓ Goniometrics of Human Body
- ✓ Human Biomechanics
- ✓ Human Engineering
- ✓ Human Motion Analysis
- ✓ Human Tissue Systems
- ✓ Introduction in Biophysics
- ✓ Introduction in to Prosthetics and Orthotics
- ✓ Live and Work Conditions of Handicap People
- ✓ Mechanical Metrology
- ✓ Mechatronics for Biomedical Engineering
- ✓ Medical Devices Design
- ✓ Medical Devices I.
- ✓ Medical Equipment
- ✓ Medical Psychology
- ✓ Medical Systems
- ✓ Motion System
- ✓ Operation Technics
- ✓ Orthopedic Diagnostic and Treatment
- ✓ Parts and Modules of Medical Devices
- ✓ Physiology and Pathophysiology
- ✓ Prosthetics and Orthotics
- ✓ Prosthetics Physiotherapy
- ✓ Rehabilitation
- ✓ Rehabilitation Technics
- ✓ Semestral Project
- ✓ Sensor Systems for Biomedical Engineering
- ✓ Supporting Technologies for Handicap People
- ✓ Team Work
- ✓ Terminal Project

GRADUATE THESES

BACHELOR'S THESES:

Prosthetics and Orthotics

Balogová Alena	Orthotic solution possibilities of medial and lateral epicondylitis
Béresová Ivana	Analysis and proposal of human body referential models for implants testing
Čajková Alžbeta	Testing and certification of plastics for prosthetic and orthotic applications
Ďáková Ľuboslava	Back pain diagnostics by infrared thermography
Fialka Eugen	Manufacturing of spinal orthoses used for scoliosis correction

Glittová Darina	Mechanical testing of specific orthotic materials
Hack Jakub	Orthotic solution of traumatic injuries in motocross sport
Hospodárová Miroslava	Human body scanning by utilization of scanners for prosthetic and orthotic applications
Klimeková Mária	Production of dental bridges and crowns - modern materials and technologies
Lukjanov Maxim	3D scanning workplace design for prosthetic and orthotic applications
Marušinová Katarín	Legislation and Administration in the Orthopaedic Prosthetics
Mat'ášová Marianna	Digitalisation of spinal orthoses
Miakyš Jakub	Deformation evaluation of thermoplastic plantar orthotic insole made by method of silicon imprint bags
Nalevanková Martina	Orthoses design
Oravec Peter	Manufacturing of lower extremity prosthetic sockets
Pajkošová Lucia	News in assistive technologies for persons with disabilities
Semanová Michaela	Rehabilitation management of amputees
Schnitzer Marek	Prosthetic retina
Tarhaničová Terézia	Deformation consideration of composite plantar orthotic insoles
Vargová Blažena	Sportsmen feet plantographic evaluation at the selected sports
Vystavilová Michaela	Approaches of orthotic treatment of partial knee ligaments

MASTER'S THESES:**Biomedical engineering**

Dadej Róbert	Software proposition for intraabdominal pressure measuring applications
Diro Jaroslav	Technical parameters of security cameras
Fazekašová Enikő	Dynamic and fatigue testing of biomaterials
Fedorová Lucia	Evaluation of upper limb motorics using EMG
Marinčák Lukáš	Custom implants design and manufacturing using additive manufacturing
Marton Lukáš	Historical development of material engineering applications in prosthetics
Šivec Andrej	Subsystem design solutions for intra - abdominal pressure
Soták Martin	Utilisation of pneumatic muscles in rehabilitation robotics devices
Vályiková Zuzana	The force plate utilisation for senior's gait evaluation
Vincenty Ivana	Nonlinear human gait analysis
Zacharová Martina	Design of rehabilitation methods for treatment of upper limbs by robotics device

HABILITATION THESIS:**Hudák Radovan**

Diagnostics of biomechanical relations in application of special orthoses

RESEARCH AT THE DEPARTMENT**Area of research:**

- ✓ Technology in the diagnosis of components and modules Computerized tomography (CT).
- ✓ Center for research of control of technical, environmental and human risks for permanent development of production and products in mechanical engineering.
- ✓ Excellence center of biomedical technology research.
- ✓ Research of new diagnostic methods in invasive implantology.
- ✓ New strategy for effective measurements with coordinate measuring machines with multi sensor systems.
- ✓ Optimization of technology method of orthotics and prosthetics with infrared thermography diagnostic.
- ✓ Virtual laboratory for 3D coordinate measurement.

Research characteristics:

The research of the Department of Biomedical Engineering and Measurement is oriented to:

- ✓ Technology in the diagnosis of components and modules by computerized tomography (CT).
- ✓ New diagnostic methods in invasive implantology.
- ✓ Optimization of technology methods of orthotics and prosthetics with infrared thermography diagnostic.
- ✓ New strategy for effective measurements with coordinate measuring machines with multi sensor systems.

PROJECTS OF THE DEPARTMENT

Title of the project Technology in the diagnosis of components and modules by computerized tomography (CT)

Type of the project OPVaV ERDF

Number of the project 26220220038

Principal investigator Jozef Živčák, Dr.h.c. prof. Ing., PhD.

Time period of the project 2010 - 2012

Title of the project The packet of innovative particulars for education reform in TUKE

Type of the project	ESF
Number of the project	26110230018
Principal investigator	Miroslav Dovica, prof. Ing., PhD.
Time period of the project	2010 - 2012
Title of the project	Center for research of control of technical, environmental and human risks for permanent development of production and products in mechanical engineering
Type of the project	OPVaV ERDF, Centre of Excellence
Number of the project	26220120060
Principal investigator	Jozef Živčák, Dr.h.c. prof. Ing., PhD.
Time period of the project	2010 - 2013
Title of the project	Excellence center of biomedical technology research
Type of the project	Centre of Excellence
Number of the project	26220120066
Principal investigator	Jozef Živčák, Dr.h.c. prof. Ing., PhD.
Time period of the project	2010 - 2013
Title of the project	Research of new diagnostic methods in invasive implantology
Type of the project	STIMULUS for VaV MŠ
Number of the project	3625/2012 - 11
Principal investigator	Jozef Živčák, Dr.h.c. prof. Ing., PhD. CEIT - KE
Time period of the project	2010 - 2013
Title of the project	Rabbit diseases and farming
Type of the project	KEGA
Number of the project	018UVLF - 4/2011
Principal investigator	Lucia Bednarčíková, Ing. PhD., Ondrejková, MVDr.
Time period of the project	2011 - 2013

Title of the project	New strategy for effective measurements with coordinate measuring machines with multi sensor systems
Type of the project	VEGA
Number of the project	1/0085
Principal investigator	Miroslav Dovica, prof. Ing., PhD.
Time period of the project	2012 - 2014
Annotation of the project	The project is concerned about the research of optimal choice of measurement strategies on the coordinate measuring machines using multi sensor systems. Strategy model designed with respect of cost - effectiveness as the one of the main criteria for strategy of measurement. Philosophy of effective measurement means to measure as precise as it is necessary and not as precise as possible. During the measurements, tactile and contactless sensor systems will be used and they determine the partial prices of particular sub - phases of measurement. Furthermore, measurement uncertainty, that include an estimate of geometric errors on the coordinate measuring machines as well as speed of measurements, will be examined. The measurement will be performed on the coordinate measuring machine with tactile and camera sensor systems and on a computed tomography.
Title of the project	Virtual laboratory for 3D coordinate measurement
Type of the project	KEGA
Number of the project	005STU/4 - 2012
Principal investigator	Miroslav Dovica, prof. Ing., PhD.
Time period of the project	2012 - 2014
Annotation of the project	The project is a continuation of a previous project in the field of 3D measurement. Laboratory responds to the requirements of metrological practice and reduces the lack of knowledge and skills students are required in handling sophisticated measuring techniques in mechanical engineering as well as in the automotive industry. The project is designed for students of first, second and third degree university students who have basic knowledge of engineering metrology. Emphasis is placed on the use of their knowledge for the purpose of measuring and assessing quality of complex shape of machine parts produced by conventional and progressive technologies.
Title of the project	Educational center of embryology and micromanipulation techniques.
Type of the project	KEGA

Number of the project	011UPJŠ - 4/2012
Principal investigator	Michalíková Monika, Ing., PhD.
Time period of the project	2012 - 2014
Annotation of the project	Assisted reproduction is one of the youngest medical branches, but from 1978 it gives the chance to many couples to have genetically own child. The incidence of infertility rises and so rises also the need for more IVF cycles, each year. The professionals in biological sciences are not satisfactory informed in assisted reproduction, and until now there is no educational center for assisted reproduction embryology in Slovakia. The establishment of such educational center for embryology and micromanipulation techniques would give the chance to student of biological sciences to familiarize with this medical branch. It would also give chance to achieve the practical skills that are necessary for the embryologist practice.

VISITS OF STAFF MEMBERS FROM FOREIGN INSTITUTIONS

Employees and students	Country
Kneppo Peter, prof. Ing., DrSc.	ČVUT Prague, Faculty of Biomedical Engineering
Magin Richard L., prof. Dr., PhD., Priputen Peter, Ing., PhD.	University of Illinois, USA Office of the President of the SR
Siemeniako Franciszek, prof. DSc., PhD Eng. Dean	Politechnika Bialostocka, Poland

MEMBERSHIP IN SLOVAK PROFESSIONAL ORGANISATIONS

Member of scientific boards of domestic and foreign magazines
Jozef Živčák, Dr.h.c. prof. Ing., PhD.

A member of the journal "Metrológia a skúšobníctvo" (Metrology and Testing) – Slovak Republic
Jozef Živčák, Dr.h.c. prof. Ing., PhD.

A member of the journal Acta Mechanica Slovaca – Slovak Republic
Jozef Živčák, Dr.h.c. prof. Ing., PhD.

Member of the board of home magazine Trauma ISSN 1335 - 8588, Slovak Republic

Chairman of the National Grant Agency KEGA MŠ VVaŠ, Slovak Republic.
Jozef Živčák, Dr.h.c. prof. Ing., PhD.

Chairman of Committee TC 18, Slovak Republic.
Jozef Živčák, Dr.h.c. prof. Ing., PhD.

Member of scientific boards: TU SjF

Košice, TU Košice, PU FZO Prešov,
PU

Prešov, TU SjF Žilina, ČVUT FBI
Prague, KU – TF Ružomberok, FŠ PU v
Prešove, SMU Bratislava.

Jozef Živčák, Dr.h.c. prof. Ing., PhD.

**The main course supervisor of
Biomedical Engineering field.**

Jozef Živčák, Dr.h.c. prof. Ing., PhD.

**The main course supervisor of
scientific discipline Bionika a
biomechanika.**

Jozef Živčák, Dr.h.c. prof. Ing., PhD.

**The main course supervisor for the
habilitation rights and inauguration in
the field of Biomedical Engineering.**

Jozef Živčák, Dr.h.c. prof. Ing., PhD.

**Chairman of FOK (faculty committee) in
the field of Biomedical Engineering.**

Jozef Živčák, Dr.h.c. prof. Ing., PhD.

**Member of the Privy Council for project
preparation.**

Jozef Živčák, Dr.h.c. prof. Ing., PhD.

MEMBERSHIP IN INTERNATIONAL PROFESSIONAL ORGANISATIONS

**Member of scientific boards of
domestic and foreign magazines.**

Jozef Živčák, Dr.h.c. prof. Ing., PhD.

**Member of the board of a foreign
magazine Lékař a technika (The
Clinician and Technology) ISSN 0301 -
5491 (Czech Republic)**

Jozef Živčák, Dr.h.c. prof. Ing., PhD.

**Acta Mechanika a automatika Poland
Reflexotherapy (Poland)**

Jozef Živčák, Dr.h.c. prof. Ing., PhD.

**Representative of Slovak Republic and
Biomedical engineering field in a
membership of Technical University of
Košice v EAMBES – European Alliance**

**for Medical and Biological Engineering
Science.**

Jozef Živčák, Dr.h.c. prof. Ing., PhD.

**Member IFSA No. 20040120 - 001 –
International Frequency Sensor
Association.**

Jozef Živčák, Dr.h.c. prof. Ing., PhD.

**Representative of Slovak Republic v
IMEKO – TC 18 – Measurement of
Human Functions.**

Jozef Živčák, Dr.h.c. prof. Ing., PhD.

**Member of the scientific committee IOP
– „Inżynieria ortopediĉno protetiĉna“
(Poland).**

Jozef Živčák, Dr.h.c. prof. Ing., PhD.

PUBLICATIONS

BOOKS:

[1] MADARÁSZ, Ladislav – ŽIVČÁK, Jozef: **Aspects of Computational Intelligence: Theory and Applications** Revised and Selected Papers of the 15th IEEE International Conference on Intelligent Engineering Systems 2011, INES 2011/, - 1. vyd - Berlin Heidelberg:

Springer - Verlag - 2012. - 436 p. - ISBN 978 - 3 - 642 - 30667 - 9.

[2] HUDÁK, Radovan – PENHAKER, Marek – MAJERNÍK, Jaroslav: **Biomedical Engineering - Technical Applications in Medicine** - 1. vyd. - Rijeka: InTech - 2012. - 420 p. - ISBN 978 - 953 - 51 - 0733 - 0.

- [3] HUDÁK, Radovan – ŽIVČÁK, Jozef – MAGIN, L. Richard: **Applications of Metrotomography in Biomedical Engineering** - 2012.In: Biomedical Engineering - Technical Applications in Medicine. - Rijeka: InTech, 2012 P. 225 - 244. - ISBN 978 - 953 - 51 - 0733 - 0
- [4] HUDÁK, Radovan - [et al.]: **Biomedical Applications of Diagnostics and Measurements by Industrial Computer Tomography** - 2012.In: Aspects of Computational Intelligence: Theory and Applications. - Germany: Springer, 2012 P. 335 - 355. - ISBN 978 - 3 - 642 - 30667 - 9
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- [6] TKÁČOVÁ, Mária - [et al.]: **Determination of Conditions and Positions for Obtaining Thermographic Atlas** - 2012.In: Aspects of Computational Intelligence: Theory and Applications. - Germany: Springer, 2012 P. 375 - 391. - ISBN 978 - 3 - 642 - 30667 - 9
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- TEXTBOOKS:**
- [1] DOVICA, Miroslav - [ET AL.]: **TRÉNINGOVÉ PODKLADY PRE SÚRADNICOVÚ METROLÓGIU - 1. VYD. - KOŠICE: TU - 2012. - 307 s.. - ISBN 978 - 80 - 553 - 1121 - 0.**
- [2] HUDÁK, Radovan: **DIAGNOSTIKA BIOMECHANICKÝCH POMEROV PRI APLIKÁCII ŠPECIÁLNYCH ORTÉZ - 1. VYD. - KOŠICE: TU - 2012. - 41 s.. - ISBN 978 - 80 - 553 - 1156 - 2.**
- [3] HUDÁK, Radovan: **BIOMECHANICKÉ MERANIE KONTAKTNÉHO TLAKU V PROTETIKEA ORTOTIKE - 1. VYD. - KOŠICE: TU - 2012. - 36 s.. - ISBN 978 - 80 - 553 - 1155 - 5.**
- JOURNALS:**
- [1] VRANOVÁ, Jana - [et al.]: **Incidence of cutaneous malignant melanoma in the Czech Republic: The risks of sun exposure for adolescents** - 2012.In: Neoplasma. Roč. 59, č. 3 (2012), s. 316 - 325. - ISSN 0028 - 2685 Spôsobprístupu: <http://www.neoplasma.sk>.
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Department of Automation, Control and Human Machine Interactions



Contact

Šimšík Dušan,
prof. Ing., PhD.
E - mail: dusan.simsik@tuke.sk
Address: Letná 9, 042 00
Košice, SR
Phone no.: +421 55 602 2654
Fax.: +421 55 602 2654



Staff

- Professors: 1
- Assoc. Professors: 3
- Assist. Professors: 2
- Researchers: 2
- PhD. Students: 10 internal, 7 external

Activities at the department

Date	Title of the event, activity characterizing the life at the department in 2012
1/2012	SAMI, IEEE 10th International Symposium on Applied Machine Intelligence and Informatic. Organising and chairing the Special Session on Ambient Intelligence and Assisted Living by prof. Šimšík.
2/2012	IASTED Conference Biomedical Engineering and Symposium on Assistive Technologies, Innsbruck, Austria. Chairing the Int. Conference on Assistive Technology.
2/2012	Int. Conference ARTEP2012, Stará Lesná, Slovakia. Co organising the conference.
5/2012	Celebration of 60th anniversary of FME
6/2012	Final examinations of Master students in "Automation"
11/2012	Organising of Kick off meeting for the project TEMPUS ASPIRE Hosting of Kick off meeting for Tempus ASPIRE project, Training for Armenian and Georgian Universities managers.

EDUCATION AT THE DEPARTMENT

STUDY PROGRAMS

Bachelor's degree:

No study program at bachelor level

PhD. degree:

- **Automation and Control (AC)**

Master's degree:

- **Automation and Control of Machines and Processes (ACMP)**

Number of the students (till 30. 10. 2012)

on the study programs guaranteed by the department:

first year of study:

- 12 internal form of study

second year of study:

- 18 internal form of study

Number of the graduates (2011/2012)

on the study programs guaranteed by the department:

- 12 students in the internal form of engineering study

GRADUATE PROFILE

MASTER'S PROGRAMS (Ing.)

Automation and Control of Machines and Processes

Graduates of this study program have good background in the theory of automation and control including artificial intelligence algorithms. They are prepared to design automated control and information systems independently, implement and operate them. Theoretical knowledge and practical skills allow them to work in industry, ICT field, design of products/services, and in research too. Graduates have experience with CAD systems, design and simulation tools for FESTO automation, automation of products or services using mobile technologies, wireless sensor networks, programming and implementing PLC or other tools of automatic control.

PhD. PROGRAMS (PhD.)

Automation and control

Postgraduates obtain wider theoretical knowledge in the field of informatics, automatic control, communication and artificial intelligence. Their get skills in work with PLM systems, modelling and simulation systems, wireless sensors networks design, ambient intelligence, tele - monitoring and control, fundamentals in experimental work and data analysis. Postgraduates are able to work in research and developmental institutions, in management positions in the field of sophisticated automated production technologies and as staff at universities.

LIST OF SUBJECTS GUARANTEED BY THE DEPARTMENT

Automation and Control of Machines and Processes

- | | |
|---|---|
| ✓ Application of Neural Networks | ✓ Industrial Control Systems |
| ✓ Automated Production Systems | ✓ Reliability and Safety of Technical Systems |
| ✓ Automatic Control Theory I. | ✓ Information and Control Systems |
| ✓ Automatic Control Theory II. | ✓ Master Thesis |
| | ✓ Mechatronic Systems |
| ✓ Automatic Control Tools I. | ✓ NC Machines and Systems |
| ✓ Automatic Control Tools II. | ✓ Programming Languages and Tools |
| | ✓ Semestral Project |
| ✓ CIM and Information Security | ✓ Semestral Project I. |
| ✓ Computer Systems and Networks | ✓ Sensor Systems |
| ✓ Control of Complex Systems | ✓ Servo Systems |
| ✓ Electrical Technology for Automation | ✓ Systems with Artificial Intelligence |
| ✓ ICT for Ambient Intelligence | ✓ Technical Measurement and Diagnostic |
| ✓ Identification, Modelling and Simulation of Systems Logic Control | |

List of subjects guaranteed by the department at another programs of Mechanical Engineering Faculty

- ✓ Assistive Technology
- ✓ Automation of Industrial Technologies
- ✓ Bio - cybernetics
- ✓ Electrical Drives
- ✓ Electrical Engineering
- ✓ Ergonomical and Kinesiological Measurements
- ✓ Fundamentals of Automotive Electronics
- ✓ Fundamentals of Rehabilitation Engineering
- ✓ History of Science and Technology
- ✓ History of Technology
- ✓ Human Motion Analysis
- ✓ Information and Management Systems
- ✓ Intelligent Manufacturing Systems
- ✓ Introduction to CAD Solid Modelling
- ✓ Living and Working Conditions of Disabled
- ✓ Management of Products Development
- ✓ Medical Electronics
- ✓ Products Testing

GRADUATE THESES

MASTER'S THESES:

Automation and Control of Machines and Processes

Dinga Vladimír	Application of computer vision for shape recognition
Dzurňák Ján	Optimal temperature control with new control structures for education purposes
Fiolek Rastislav	The utilisation of advanced driving and regulation automatic units for wheelchairs
Grega Lukáš	Design of construction and sensoric system for rehabilitation device
Janitor Michal	Laboratory model for control of water level in tanks
Karchňák Ján	The analysis of upper limb movement during rehabilitation by MEMS sensors
Leibicz Peter	The design of mobile robot concept for conditions of competition Robotour
More Marcel	Design and realisation of control system for upper limb rehabilitation device
Olejník Matej	Remote control of industrial robot
Petrik Stanislav	Advanced drives with switched reluctance motor with aim on sensorless control
Sagula Marián	Utilisation of advanced technologies PLM in modern manufacturing
Sándor Miroslav	Microprocessor control of two - engined electric motor drive - electronic differential

PhD. THESES:

Automation and Control

Andrášová Marianna	New technologies for creating of intelligent environment for seniors households
Balog Róbert	Optimalisation of mechatronics and ergonomics parameters of rehabilitation shoe
Biroš Ondrej	Sensor networks in automation and household monitoring with wireless technologies utilisation
Feriančík Miloslav	Autonomous positioning based on machine vision
Fodor Marek	Design of sensory system for automated devices
Gorlický Miroslav	Mechatronic rehabilitation device controlled by chaotic signals
Jobbágy Boris	Development of robotics devices with pneumatic muscles for upper limb rehabilitation
Karchňák Ján	Inertial sensors in monitoring of physical activities and events
Maxim Marek	The potential and application of a high - end CAD
More Marcel	The use of intelligent methods in control of rehabilitation robots with the force feedback
Olejník Matej	Mobile communication interfaces in industry and services
Petrík Stanislav	Modelling, control and simulation of product life - cycle
Salah Alfitory Mousa	Multiagent networks in monitoring and control of industrial processes and services using wireless technology
Siničák Vojtech	Process control through web interfaces
Szerdiová Lenka	Verification of the effectiveness of seniors walk training with rehabilitation mechatronic shoes
Veselíny Marián	Utilisation of artificial intelligence in automated rehabilitation devices
Župa Tomáš	Control of mobile robots

RESEARCH AT THE DEPARTMENT

Area of research:

Automation and Control

- ✓ Automation and control in industry and services.
- ✓ Application of artificial intelligence methods for the identification, modelling, simulation and control of non - linear systems and biometrics.
- ✓ Design and modelling of man - machine communication interface.

Research characteristics:

Automation and Control

Department perform scientific research, particularly in these areas: automation and control in industry and services, application of artificial intelligence methods for the identification, modelling, simulation and control of non - linear systems and in

biometrics, modelling and communication interface man – machine, wireless sensor networks, tele - monitoring and control, ambient intelligence, rehabilitation robotics, ICT services and home automation, e - Accessibility and Autonomy.

Areas of expertises:

Automation and Control

- ✓ automation and control in industry
- ✓ wireless sensor networks and actuators
- ✓ automated products and services in human fields
- ✓ human motion analysis
- ✓ ambient intelligence and domestic automation
- ✓ artificial intelligence methods applications for identification,
- modelling, simulation and control of nonlinear systems and biometrics
- ✓ modelling and development of human - machine interfaces
- ✓ switched reluctance motor control

PROJECTS OF THE DEPARTMENT

Title of the project	Research and development of the Intelligent non - conventional actuators based on artificial muscles
Type of the project	OP Research and Development, Implementation of knowledge and technologies obtained by research and development
Number of the project	ITMS 26220220103
Principal investigator	doc. Ing. Ján Pitel', PhD.
Time period of the project	10/2010 - 09/2013
Annotation of the project	The expected project output is the design and implementation of intelligent artificial muscle - based actuator and its technical documentation in such a way that it is be possible to use it for manipulation and rehabilitation tasks in practice. The actuator shall be able to adapt to varying parameters in controlled process using sophisticated intelligent control techniques and methods. Another project output is the design of progressive and energetically cost - effective artificial muscle - based manipulation and rehabilitation devices with positive impact on: - productivity of manipulation processes in manufacturing, - rehabilitation process resulting in better health of patients after rehabilitation and decreased manual demands on rehabilitation workers.

NATIONAL PROJECTS

Title of the project	Theoretical principles, methods and tools for senior's mobility diagnostics and rehabilitation
Type of the project	Grant project VEGA
Number of the project	1/1162/11
Principal investigator	prof. Ing. Dušan Šimšík, PhD.
Time period of the project	01/2011 - 12/2013
Annotation of the project	The main aim of this project is to develop the complex diagnostical and rehabilitation system with prevention impacts on decreasing of risk of seniors falls and their cosequences. The core of the solution is an analysis of theoretical principles and development of new tools and services based on qualitative and objective quantitative methods. End users are health care proffesionals from rehabilitation departments, geriatrics centers, retirement houses, fitneess centres, and individual users - seniors. Rehabilitation system is supported by fall identification system and emergency alarm for household of elderlies living alone..

INTERNATIONAL PROJECTS

Title of the project	ASPIRE - Access to society for people with individual requirements
Type of the project	TEMPUS IV
Number of the project	530345 - TEMPUS - 1 - 2012 - 1 - GE - TEMPUS - JPHES
Principal investigator	prof. Ing. Dušan Šimšík, PhD.
Time period of the project	10/2012 - 9/2015
Annotation of the project	ASPIRE program aims to foster the rights of individuals with special needs to access education and enjoy the right of participation in everyday society, to combat discrimination of the individuals with special needs by instilling awareness and acceptance in society as in line with Bologna Process and the UN Convention on the Rights of Persons with Disabilities.

VISITS OF STAFF MEMBERS TO FOREIGN INSTITUTIONS

Power machines and equipments

Employees and students	Country
Šimšík Dušan, prof. Ing., PhD.	Denmark, Austria, Czech Republic, South Korea, China, Netherland

Galajdová Alena, Ing., PhD.

Austria, Denmark, Netherland, Czech
Republic

Líška Ondrej, doc. Ing., CSc.

Czech Republic

Veseliny Marian, Ing.

Czech Republic

Feriančík Miloslav, Ing.

Czech Republic

Siman Daniel, Ing.

Czech Republic

Szerdiová Lenka, Ing.

Czech Republic

Gorlický Miroslav, Ing.

Italy

Biroš Ondrej, Ing.

Italy

MEMBERSHIP IN SLOVAK PROFESSIONAL ORGANISATIONS

**Member of SBMI committee - (Society
for Biomedical Engineering and Medical
Informatics)**

Dušan Šimšík, prof. Ing., PhD.

**Member of SASI (Slovak Association of
Mechanical Engineers)**

Dušan Šimšík, prof. Ing., PhD.

**Member of SSAKaI (The Association of
Slovak Scientific and Technological
Societies)**

Dušan Šimšík, prof. Ing., PhD.

**Member of SLS (Slovenská lekárska
spoločnosť – odborná spoločnosť pre
fyziatriu, balneológiu a liečebnú
rehabilitáciu)**

Dušan Šimšík, prof. Ing., PhD.

MEMBERSHIP IN INTERNATIONAL PROFESSIONAL ORGANISATIONS

Member of Int. committee IMEKO TC 17 –
Measurement in robotics

Member of the Board and National
coordinator of AAATE - Association for the
Advancement of Assistive Technology in
Europe

Chairman of ICTA Europe – International
Commission on Technology and
Accessibility, Subcommission of
Rehabilitation International (RI); member
of RI Executive Commission

National Contact of EDEaAN – European
Design for All e - Accessibility Network;
National Contact of EASTIN – European
Assistive Technology Information Network
Member of BEL – Biomechanics European
Laboratory

Dušan Šimšík, prof. Ing., PhD.

Member of AAATE - Association for the
Advancement of Assistive Technology in
Europe;

Secretary of ICTA Europe – International
Commission on Technology and
Accessibility, Subcommission of
Rehabilitation International (RI);

Member of EDEaAN – European Design
for All e - Accessibility Network;

Member of EASTIN – European Assistive
Technology Information Network;

Member of BEL – Biomechanics European
Laboratory.

Alena Galajdová, Ing., PhD.

PUBLICATIONS

Textbooks

- [1] ŽIDEK, Kamil - MAXIM, Vladislav: **Programovacie jazyky a nástroje** - 2012, In: 1. Vyd. - Prešov: FVT TU - 2012. - 108 s.. - ISBN 978 - 80 - 553 - 1104 - 3.

Journals

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- [2] SZERDIOVÁ, Lenka - ŠIMŠÍK, Dušan - DOLNÁ, Zlatica: **Assessment of kinematics of sports men performing standing long jump in 2 different dynamical conditions** - 2012. In: Metrology and measurement systems. Vol. 19, no. 1 (2012), p. 85 - 94. - ISSN 0860 - 8229

- [3] ŠIMŠÍK, Dušan - GALAJDOVÁ, Alena - SIMAN, Daniel - ANDRÁŠOVÁ, Marianna - BALOG, Róbert: **Information technology supporting daily activities of seniors** - 2012.In: Gerontechnology. Vol. 11, no. 2 (2012), p. 306. - ISSN 1569 - 1101

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- [5] ŠIMŠÍK, Dušan - GALAJDOVÁ, Alena - SIMAN, Daniel - BUJŇÁK, Juraj - ANDRÁŠOVÁ, Marianna - NOVÁK, Marek: **Mon AMI Platform in Elderly Household Environment Architecture, Installation, Implementation, Trials and Results** - 2012.In: Lecture Notes in Computer Science: Computer Helping People with Special Needs. - Berlin Heidelberg: Springer - Verlag, 2012 No. 7383 (2012), p. 419 - 422. - ISBN 978 - 3 - 642 - 31533 - 6 - ISSN 0302 - 9743

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- [7] ŽIDEK, Kamil - LÍŠKA, Ondrej - MAXIM, Vladislav: **Advanced rehabilitation device based on artificial muscle actuators with neural network implementation** - 2012.In: Journal of automation, mobile robotics & intelligent systems. Vol. 6, no. 3 (2012), p. 30 - 32. - ISSN 1897 - 8649

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- [10] ŽIDEK, Kamil - DOVICA, Miroslav - LÍŠKA, Ondrej: **Angle Measuring by Mems Accelerometers** - 2012.In: Journal of Automation, Mobile Robotics & Intelligent Systems. Vol. 6, no. 4 (2012), p. 3 - 6. - ISSN 1897 - 8649

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- [13] VESELINÝ, Marián - LÍŠKA, Ondrej: **Neurónové siete ako časť riadenia moderného rehabilitačného zariadenia** - 2012.In: Strojárstvo extra. Č. 5 (2012), s. 23 - 1 - 23 - 3. - ISSN 1335 - 2938

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- [15] GORLICKÝ, Miroslav - BALOG, Róbert - ŠIMŠÍK, Dušan - GALAJDOVÁ, Alena: **Možnosti zlepšenia a optimalizácia prvkov mechatronickej rehabilitačnej topánky pre aplikáciu v domácnosti** - 2012.In: Strojárstvo extra. Č. 5 (2012), s. 19 - 1 - 19 - 4. - ISSN 1335 - 2938

- [16] ŠEMINSKÝ, Jaroslav: **Metodológia navrhovania a povaha technického diela** - 2012. - 1 elektronický optický disk (CD - ROM).In: Strojárstvo extra. Č. 5 (2012), s. 16/1 - 16/3. - ISSN 1335 - 2938

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- [18] JOBBÁGY, Boris - FODOR, Marek - ŠIMŠÍK, Dušan: **Návrh konštrukcie rehabilitačného zariadenia s využitím umelých svalov** - 2012. In: 1 elektronický optický disk (CD - ROM).In: Strojárstvo: Extra. Roč. 2012, č. 5(2012), s. 22/1 - 22/3. - ISSN 1335 - 2938

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- SR. - Košice: TU, 2012 S. 571 - 577. - ISBN 978 - 80 - 553 - 0835 - 7
- [15] SUROVEC, Róbert - GMITERKO, Alexander - KELEMEN, Michal - ŠIMČÁK, František - FODOR, Marek - VIRGALA, Ivan - PRADA, Erik - VACKOVÁ, Martina: **Kinematican alysis of snake - like robot using obstacle aided locomotion** - 2012. - 1 elektronický optický disk (CD - ROM).In: SAMI 2012: 10th IEEE Jubilee International Symposium on Applied Machine Intelligence and Informatics: proceedings: Herľany, Slovakia, January 26 - 28, 2012. - Budapest: IEEE, 2012 S. 451 - 455. - ISBN 978 - 1 - 4577 - 0195 - 5
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INSTITUTE OF TECHNOLOGIES AND MANAGEMENT

- Department of Technologies and Materials
- Department of Industrial Engineering and Management





Department of Technologies and Materials



Contact

The head: Spišák Emil,
prof. Ing., CSc.
E - mail: emil.spisak@tuke.sk
Address: Mäsiarska 74,
041 01 Košice, SR
Phone no.: +421 55 602 3502
Fax.: +421 55 602 5186



Staff

- Professors: 5
- Assoc. Professors: 8
- Assist. Professors: 17
- Researchers: 5
- PhD. Students: 10

Activities at the department

Date	Title of the event, activity characterizing the life at the department in 2012
6/2012	International scientific conference – Progressive Technologies and Materials in Mechanical Engineering

EDUCATION AT THE DEPARTMENT

STUDY PROGRAMS

Bachelor's degree:

- Automotive Production
- Computer Aided Mechanical Engineering Production
- Technology, Management and Innovation of Mechanical Engineering

PhD. degree:

- Mechanical Engineering Technologies and Materials

Master's degree:

- Automotive Production
- Mechanical Engineering Technologies
- Computer Aided Mechanical Engineering Production

Number of the students (till 30. 10. 2012)

on the study programs guaranteed by the department:

first year of study:

- 205 internal form of study
- 10 external form of study

second year of study:

- 257 internal form of study
- 43 external form of study

third year of study:

- 109 internal form of study
- 17 external form of study

Number of the graduates (2011/2012)

on the study programs guaranteed by the department:

- 131 students in the internal form of engineering study
- 33 students in the external form of engineering study
- 70 students in the internal form of bachelor study
- 5 students in the external form of bachelor study
- 7 PhD. students in the internal form of study (defended PhD. thesis)
- 2 PhD. students in the external form of study (defended PhD. thesis)

GRADUATE PROFILE

BACHELOR'S PROGRAMS (Bc.)

Automotive Production

Graduate is able to design and project production processes and production sequence of components, assemblies and testing of automotives aggregates and automobiles. He is able to cooperate with innovation propositions of automotive components and work on rationalizing projects. Is also able to cooperate on manufacturing places planning, and insuring their managing with the intention of productivity, quality, environmental and safety characteristics.

Graduate is able to organize material and information flows in the supply networks of automotive industry. He has control over techniques of informative technologies applications in the production preparation, planning, production management and testing.

He has control over techniques of laboratory works and experiments of project managing. Graduate can apply in the sphere of technological preparation, production planning, projection of automotive components and aggregates, testing and in the service favors. He can apply in the sphere of services connected with automotive industry, in service and consultant companies and also as small entrepreneur.

Computer Aided Mechanical Engineering Production

Graduate of bachelor student program Computer Aided Mechanical Engineering Production is able to solve problems related with introducing and running of production – technological systems. Graduates have knowledge about production technologies (machining, mechanical working, welding, surface modifying, thermal working, assembling, transporting and warehousing, materials, manufacturing machines, facilities of operational and interoperable manipulation and transport, control of production processes and their controlling. Mentioned special accomplishments have expanded of knowledge from computing techniques, CA systems and CA technologies used by the preparation and production management. Graduates have additional accomplishments on the basis of which they are able to communicate with others professions and elements participated on ensuring of production (management, construction, supplying, etc.)

Graduates have ability to assert by the implementation and controlling of production – technological systems just how technologist. They have knowledge necessary to ensuring intelligent operation and solving non - standard situation which comes into being by working. They also have sufficient knowledge to projecting integrated parts of production progress.

Technology, Management and Innovation of Mechanical Engineering

Graduates of the Production technology program and study program Technologies, management and innovation of mechanical engineering in 1st level of university degree found your applicable as manufacturing technologist, engineers of tools and equipment, workers in CAx technology service, specialist for testing, operation and maintenance, especially of the upstream sector of the automotive industry in the development of components, production management of vehicles and other related activities connected with automotive industry.

The application can also be found in the lower control service level, technical services of operations and companies and can be also the management unit's members of larger organizations.

MASTER'S PROGRAMS (Ing.)

Automotive Production

Educational program Automotive Production is intended for preparation of engineers with focus on mechanical engineering for production new products, designing of production processes and managing automobile manufacturing and their components. Graduate has knowledge and ability of using them to the technologies of manufacturing components, assembling aggregates and their testing, production technique and structure of manufacturing workplace, logistician and organization of supply chains of automotive industry. Content of study program is realized through education in such way, that theoretical, research, special and applied knowledge throughout innovation trends of automotive production were to be provided. Graduate have knowledge onto production of new and innovated products primarily technology of computer aided design and engineering, virtual reality, production of prototypes and theirs testing. They have knowledge about methods of slip and agile production and about implementation of high tech. A part of graduate profile is also knowledge of foreign language and adequate attainments from economies, management, environmental direction and safeness of systems. Graduation have additional accomplishment on basis of which, they are able to work in team with other professions participated on securing of production (marketing, service trades, logistics, etc.). Graduate have application in wide spectrum of professions of automotive production, at researchers and developments centers of automotive producers and supplier's of aggregate and components, in the units of preparation of production just how designers of production processes and systems. Graduate works in positions of production engineers able to insure quality and effectiveness of production and its continual innovation.

Mechanical Engineering Technologies

Graduates of master degree in program Mechanical Engineering Technologies are able to systematically and complexly solve problems of preproduction, processing and after processing stage with support of CAx Technologies. They have knowledge about possibilities of conventional and unconventional technique of production of semi products, complete parts, tenet of techno – sanity construction parts and products, and knowledge about methods of quality control. These abilities are integrated with knowledge of economical character, what enables to the graduate solve even problems of managing and processing of mechanical and electrotechnical productions. All of these activities are performed with the support of mathematical modeling method, method of simulation, logisticians and mathematical optimization. Graduates of master degree in field of study – Manufacturing technologies and in educational program – mechanical engineering technologies acquire attainments from common technological disciplines from this specialization, from special technology disciplines of specialization, as well as from discipline of natural sciences. Graduate simultaneously obtain accomplishments at area of informative technologies by the solving of specialization problems and practice in laboratorial work. A part of education is knowledge of foreign language and adequate knowledge from area of economy, law

and next humane departments. By studying of this specialization, graduate obtain ability to specialize oneself and assumption of perpetually self educating.

Computer Aided Mechanical Engineering Production

Graduate of educational program acquire knowledge connected with development of production Technologies as well as knowledge needs to use new engineering materials in the mechanical engineering production. In this program, accent is put on connection of management and production technology in the modern structure of industry as well as encompassment of informative bindings at production systems. Graduate are able to work with PC techniques and her applications in the area of CAD/CAM, by the production planning (CAPP), in modeling, simulating and optimizing of technological processes, in creation of technologically oriented databases, in managements of engineers information etc. Acquired attainments enable graduates wide range of application in technological specializations of manufacturing, in area of using computing techniques, in the automation of engineering activities at production. Graduates are characterized by adaptability and flexibility towards condition changing in area of production practice.

PhD. PROGRAMS (PhD.)

Mechanical Engineering Technologies and Materials

The third degree of university study in field of Mechanical Engineering Technologies and Materials deepens and widens theoretical knowledge from technological discipline from area of metallurgy, progressive technology of non cutting and splintery processing of metals, automation of technological processes and possibilities of their application in mechanical engineering corporations, with the ecological aspect. Graduate of doctoral study will have application at research – development departments of manufacturing corporations, top level managerial functions, managing of manufacturing departments with sophisticated production technique, institutes of Slovakia's academy of science, on technical universities and on technical high schools.

LIST OF SUBJECTS GUARANTEED BY THE DEPARTMENT

Power machines and equipments

- | | |
|---|--|
| ✓ Accuracy and Control of Production | ✓ Automotive Production Technologies |
| ✓ Advanced Processing Technology | ✓ Automotive Supply Chain Management |
| ✓ Applied Database Systems | ✓ Automotive Testing |
| ✓ Applied Informatics | ✓ Bachelor Theses |
| ✓ Applied Informatics in Technology | ✓ Bachelor Theses Habilitation |
| ✓ Assembly Technologies and Joining | ✓ Basics of Enterprising |
| ✓ Automation of Engineering Works | ✓ Basics of Enterprising in Machinery Production |
| ✓ Automobile Service Devices | ✓ Basics of Innovations |
| ✓ Automotive Components Manufacturing | ✓ Basics of Product Design for Automotive Production |
| ✓ Automotive History | ✓ Basics of Work Rationalization |
| ✓ Automotive Operation and Maintenance | ✓ Basis of Mechanical Production |
| ✓ Automotive Operation, Maintenance and Service | ✓ Basis of NC Machines Programming |
| | ✓ Business Fundamentals |

- ✓ Business Plan
- ✓ CA Methods in Technological Processes I.
- ✓ CA Methods in Technological Processes II.
- ✓ CA Methods in Technological Processes III.
- ✓ CAD / CAM Systems - Automation of Technical Preparation of Production
- ✓ CAD Design of Product and Manufacturing
- ✓ CAD in Technology
- ✓ Calculated Methods in Technologies
- ✓ CAx Technologies in Preparation and Management of Production
- ✓ Ceramics Coatings
- ✓ Certification and Standardization
- ✓ Computer aided mechanical production
- ✓ Computer aided production planing - CAP
- ✓ Computer Aided Simulation
- ✓ Computer Design of Dies and Tools
- ✓ Construction materials
- ✓ Creative Work Methodics
- ✓ Defense of Diploma Thesis
- ✓ Defense of Final Work
- ✓ Design and production of dies and tools II
- ✓ Design and Production of Tools I.
- ✓ Design and Production of Tools II.
- ✓ Design of Automotive Manufacturing Workstations and Workshops
- ✓ Design of Automotive Production
- ✓ Design of Fixtures
- ✓ Design of Laboratories and Test - rooms
- ✓ Design of Production Systems
- ✓ Design of Technological Processes
- ✓ Diploma Project
- ✓ Diploma Thesis
- ✓ Experimental Methods of Technology
- ✓ Final Project
- ✓ Final Work
- ✓ Geometrical Specifications of Products
- ✓ Graduation Theses Habilitation
- ✓ Informatics and PC I.
- ✓ Informatics and PC II.
- ✓ Information Systems
- ✓ Information Technologies I.
- ✓ Information Technologies II.
- ✓ Innovation and Reengineering Strategies Management
- ✓ Innovation Technologies
- ✓ Innovations
- ✓ Innovations in Automotive Manufacturing
- ✓ Intensification of Production Technologies
- ✓ Laboratory Exercises I - Automotive Components
- ✓ Laboratory project
- ✓ Machines and Tools for Plastics Processing
- ✓ Machines and Tools for Plastics Processing I.
- ✓ Machines and Tools for Plastics Processing II.
- ✓ Management of product development
- ✓ Material Flows and Logistics
- ✓ Materials Engineering
- ✓ Materials for Automotive Production
- ✓ Materials I.
- ✓ Materials II.
- ✓ Materials Science
- ✓ Measurement and Testing
- ✓ Mechanical Technologies and Materials I.
- ✓ Mechanical Technologies and Materials II.
- ✓ Mechanical Technologies and Materials III.
- ✓ Mechanical Technology
- ✓ Methods for Intelligent Production Processes
- ✓ Modeling and Optimization of Production Processes
- ✓ Modeling and Simulation of Manufacturing Processes and Systems
- ✓ Modeling and Simulation of Technological Processes
- ✓ Modeling of Technological Processes
- ✓ Monitoring of Technological Processes
- ✓ NC Machine Programming
- ✓ NC Machinery
- ✓ NC Production Technics
- ✓ New Construction Materials
- ✓ New Materials
- ✓ Non - conventional Materials and Technologies I.
- ✓ Non - conventional Materials and Technologies II.
- ✓ Optimization of Technical Preparation of Production
- ✓ Planning and Design of Technical Preparation of Production
- ✓ Planning and Design of Technological Processes
- ✓ Planning and Evaluation of

- Experiments
- ✓ Precision Manufacturing and Nanotechnologies
- ✓ Process reengineering
- ✓ Processing of Technological Information
- ✓ Product innovations
- ✓ Product Innovations
- ✓ Product Logistics
- ✓ Production Quality
- ✓ Progressive and non - conventional technologies
- ✓ Progressive materials and their processing
- ✓ Progressive Production Technologies
- ✓ Progressive Technologies
- ✓ Reengineering
- ✓ Repair Technologies
- ✓ Research and Development Management
- ✓ Semestral project
- ✓ Seminar to Automotive Production Development
- ✓ Services Planning for Automobile Manufacturing
- ✓ Simulation of Discrete Processes
- ✓ Simulation of Technological Processes
- ✓ Small business I.
- ✓ Small business II.
- ✓ SMART and Intelligent Materials
- ✓ Special Materials
- ✓ Strategic Planning
- ✓ Surface Treatments
- ✓ Systems of Quality Management
- ✓ Technical Creativity
- ✓ Technical Materials
- ✓ Technical Production Preparing for Automotive Production
- ✓ Technical Production Set up Preparing
- ✓ Technological Information
- ✓ Technological Material Properties
- ✓ Technologies of Automatized Manufacturing
- ✓ Technology Assessment
- ✓ Technology I.
- ✓ Technology II.
- ✓ Technology III.
- ✓ Technology of Apparatus Techniques
- ✓ Technology of Automotive Production
- ✓ Technology of Automotive Production I.
- ✓ Technology of Automotive Production II.
- ✓ Technology - ability and Products Quality
- ✓ Technology - ability of Constructions
- ✓ Testing of Automobile and Components
- ✓ Theory and Means of Automated Control of Production Processes
- ✓ Theory and Technology of Processes of Machining, Mechanical Working and Surface Finish
- ✓ Theory and Technology of Processes of Welding, Casting and Powder Metallurgy
- ✓ Theory and Technology of Special Metallic and Non - metallic Materials Preparing
- ✓ Theory of Conventional Technologies
- ✓ Theory of Forming, Tools and Jigs
- ✓ Theory of Innovative Technologies
- ✓ Theory of Machine Cutting, Tools and Jigs
- ✓ Theory of Progressive Technologies
- ✓ Thermomechanics
- ✓ Trends of Technology Development
- ✓ Typology of Automotive Industry

GRADUATE THESES

BACHELOR'S THESES:

Akuratný Michal	Surface modelling of automotive components using the 3D CATIA
Babič Igor	Automation of work at CAD design of stamping dies
Banyay Dávid	The evaluation of surface properties of engineering components by PC utilization
Bederka Matúš	Development of turbochargers and its utilization at internal combustion engines
Čabin Ján	A review of studies of polymers used in automotive industry
Dirga Ľuboš	Catalog of high strength steels sheets made in Joomla
Dolnačko Martin	The application of workshop oriented programming of CNC machines at the free contour programming.
Falat Jakub	Tutorial for modelling free surfaces in the SolidWorks
Fodor Zoltán	The formation of test methods data base for evaluation of coating properties
Franková Mária	Progressive forming technologies
Gavenda Lukáš	Construction analysis of cabriolets.
Gelata Lukáš	A review of studies application of hot jets for heated injet systems
Greš Miroslav	Testing methods of corrosion resistance for organic coatings
Guoth Miroslav	Injection mold design for KTaM promotional items
Hanečák Milan	Possibilities of conversion of serial of vehicles for race purposes
Hegedüs Martin	The evaluation of corosion resistance of surface - treated car body sheets
Hvizdoš Erik	Innovation concepts of car chassis and drives of off - road vehicles
Chudovský Ján	A review of studies of advanced technologies of materials division
Ivan Tibor	Computer aided design for learning model - the production of pig - iron and steel
Jakubčák Róbert	The review of used nanocomposites in plastics processing
Janečko Matej	CAM system and its possibility of using the 5 - Axis machining
Jaskievič Jaroslav	RepRap opensource prototyping system
Kalmár Ladislav	Testing devices for car services
Kandera Tomáš	Assembly procedure of the selected product
Kender Ján	Design of choosen production workplace in CAD system
Kohút Peter	Non - conventional cutting of materials by laser with using of CA methods
Komloš Tomáš	Scanning possibilities of 3D objects by system ARGUS
Korečko Martin	New car concept - interior design

Krajc Marek	Innovative approaches concern Daimler AG
Kubík René	CAD visual representation of chosen basic operations in metal machining
Kysel' Luboslav	Thin layers on tools for engineering production
Lenart Marek	New car concept - innovation analyses and specification
Lopušek Dávid	Design concept of a car component
Lutter Patrik	Applications of DLC coatings in tribological systems
Macák Jakub	The technology of materials joining in automotive industry
Marcin Peter	Analysis and innovations in automotive transmission systems
Michalik Michal	Innovation of pallet transport systems in small product assembly
Murín Milan	Innovation trends in car weight decreasing
Novotný Tomáš	Processing of multimedia teaching materials for heat treatment of metals
Ondra Ľudovít	Process analyses of generating 3D models from drawing documentation
Oravec Michal	New trends in surface treatments used in automotive industry
Orolin Patrik	Enrichment of the combustion mixture of hydrogen in spark ignition engines
Palgut Patrik	Energy intensity of the technological process
Palonder Štefan	Non - conventional cutting of materials by combined technologies - laser + cutting by punching with using of CA methods
Pero Lukáš	Possibilities of modification of naturally aspirated combustion engines for race purposes
Pirožek Peter	Erosion machining and shape milling when producing molds and tools
Piso Tomáš	New methods of creating of surfaces on materials by progressive technologies with utilisation of CA methods
Pitoňák Martin	Programming of production of repeatable shapes by control system Heidenhain
Rusnák Martin	Reasons and defects removal from the coating films
Sedlák Pavol	Innovations of brake systems and components.
Seman Jozef	Cutting materials used in drilling for difficult to cut titanium and nickel based alloys
Stolárik Tomáš	Production of small parts by CNC production technique
Straka Stanislav	Creating an interactive document focused on utilization of advanced materials in automotive industry
Szabó Tamás	Testing stand project for chosen car component
Šiser Marek	Application EC - Lab software in the evaluation of corrosion pre - treated surfaces
Šofranko Peter	Review of main properties of modern coolant when machining
Šoltés Róbert	Development and innovation single - track motor vehicles

Špilko Martin	Use of rendering programs in modeling
Štefan Michal	Design specifications of special vehicles
Štefaňák Lukáš	The possibilities of using press joining methods in automotive industry
Teplica Matúš	Using MATLAB software for design, visualization and simulation of neural networks
Ungrady Michal	Use of CAx technologies in tribology
Vojtek Damián	Application of additive technologies in polymer processing moulds
Volner Jakub	An overview of properties and spectral analysis of motor oils for passenger cars
Zahurančík Michal	Computer aided evaluation of mechanically - treated surfaces

MASTER'S THESES:

Adamčík Juraj	Technological applications for manufacturing the precision plastic composite parts for automotive industry
Angyal Bartolomej	Tribological properties of thin PVD layers on Cr Al basis
Bálint Pavol	Proposal of working place for joining of materials by Flowdrill method with utilisation of CAD system
Balko Peter	Innovations of the assembly fixtures for shape complicated automobile components
Barančo Peter	Evaluation of microhardness of the welding by laser
Bednarcík Šimon	Scrap reduction in turning and grinding gears to work hard in the operation 130 and 190
Bendík Tomáš	The implementation of new knowledge at thermal drilling of materials
Béres Gabriel	Engineering services for the automotive production
Béreš Peter	Comparison of tool paths generated by CAM systems
Bliška Marcel	The studying of mechanical properties of thin metal corrosion sheets
Bodnárová Júlia	Verification of the brake current slowdown in car collisions with cyclists and pedestrians in the PC environment – CRASH
Bojko Ján	Adapting ESPRIT ADD - IN MANAGER Knowledge Base for conditions of use of tools in the manufacturing process S3 LVD
Borovský Peter	Design concept of a space - saving future vehicle
Cserei Tomáš	Innovation strategy in Valeo company
Čekovský Ladislav	Numerical simulation at drawn part die design
Česlák Ján	Innovative solution for setting seats Johnson Controls Trencin
Čuj Milan	Innovation of assembly process of extrusion valve limiter
Demko Jakub	ATV vehicles innovations
Demková Kristína	The utilization of unconventional technology for pretreatment of metal surfaces

Dolný Ján	Proposal of mechanism for opening the slide valve cover at tank wagons
Doša Viktor	Evaluation of milling strategies for production of form surfaces
Dravecký Maroš	Benefits of automotive associations and partnerships for innovation
Dunda Maroš	The use of CAD / CAM systems in the design of promotional item TUKE
Džurnák Martin	Establishment micro borings in the process of machining holes Valve Body and suggest ways of eliminating it
Emödi Adrián	Automation and modification of modular line in company Valeo Slovakia s.r.o.
Fehér Gabriel	Advanced methods for evaluation of surface treatments properties supported by e - learning system
Fehér Ludovít	Corrosion resistance of surface - treated sheets for car body
Ficko Tomáš	The study of surfaces from point of view of microgeometry using progressive computing methods
Gajdoš Martin	Structure of material flows in selected vehicle production plants
Geri Tomáš	Proposal for production stamping parts for the automotive industry unconventional technologies
Glodžák Matúš	Analysis of the welding property of new types of the steels
Gonda Ján	Models of machine tools and simulation of their kinematics in CAM systems
Greško Norbert	Automatic sequence controlling of production lines and sequantional flow of body parts ordering for the final production process in the NSF VW body shop
Grutka Miroslav	Coated sheet metals for automotive industry and their evaluation
Hronský Tomáš	Testing of potential of composite materials in automobile industry.
Hutka Adrián	The utilization of control system of Heidenhain TNC 426 to design of shaped mould cavity
Hutka Matúš	Modifications of EJ20 engine series for purpose of increasing the performance
Chabada Peter	The influence of technological parameters of laser at the processing of metal materials
Chochol Miloš	The structural design of the clamping claws of tensile testing of plastic materials
Iván Štefan	Inovation project in Magneti Marelli
Ivanko Rastislav	Innovation capacity of suppliers in automotive industry
Jacko Roland	Improvement of deposition system and data archives on department of construction
Jaremko Maroš	Forecasts and the automotive industry development prospects for 2050

Javorka Marián	Marketing strategy of sell and service of used cars
Javornický Milan	Improving the quality of education for automotive
Jenčo Vladimír	Assembly analysis of choosen component by using data glove
Jendželovský Luboš	Monitoring delays in suply cars to costumers in TPCA Kolin
Juhás Michal	Project of product assembly
Juhás Tomáš	The analysis of the properties of recycled plastic
Juhásová Erika	Experimental verification and numerical simulation of thin steel sheets drawability
Jurčina Pavol	Control process optimization at the Monitoring Department in T - system
Kaprinay Dávid	The vehicle of future - exterior design
Karafa Peter	Revision of gas pipes welds quality
Karoľ Martin	Milling strategies and their application in production of parts of complex shapes
Kocik Jaroslav	Verification of bendability simulation of steel sheets by bending test
Kofira Ján	Proposal for programming operation of gravírovacke technology in the production of 3D shape surfaces
Kolcun Ján	The influence of technological parameters of laser at the processing of plastics
Kolečavová Katarína	Analysis of the bowden cable length measurement on the door bracket in the factory Audi Valeo
Kolegová Marianna	Comparison of technology for part production by conventional and progressive technology
Kolesár Marián	Innovation project in Yakazi Slovakia
Kortiš Peter	Proposal of elevator operating in clock cycle for transporting of materials
Kotran Ján	Evaluation of structural chaning while welding
Kotuľa Tomáš	The evaluation of choosen thin layers properties on Ti and Al basis created by PVD techniques on the steel substrate
Koval Peter	Design of shaped joint for car seats
Koval' Ondrej	Effect of changes TIG brazing parameter on quality of brazed joints
Kravec Tomáš	Reduction of cars body weight by application of new materials
Kriššáková Monika	Computer aided design of mold tool for manufacture pressing part
Kubini Pavol	Neural network application for cutting tool wear prediction
Kudelás Daniel	Research and analysis of layers creations by FDM technology and its influence on product properties
Kukurová Tatiana	Analysis of impurity influence on the quality of selected parts of gear box
Kulik Matúš	The proposal of workplace for friction welding by FSW method

Kušnír Michal	Analysis and conceptual processing of functional coating paint on glass and film in order to implement technology into the manufacturing process
Lacko Tibor	Tribological properties of Ti layer deposited by PVD technique
Lajčáková Alena	Innovations in technologies and services applied in the selected servicing automobiles for VW brands
Lazorík Rastislav	Innovation for agile manufacturing systems
Leško Štefan	Analysis of R&D projects run in the automotive industry
Lipták Michal	Determination of pre - treatment surface influence on application coatings adhesion by cold zinc plating technology
Lukáč Ján	Proposal of appliance for gas pipeline welding
Maďak Tomáš	Computer aided design of production die for pressing part
Malega Peter	Dependence models of yield point and springback by deformation of packaging sheets
Mantič Marián	Innovative trailer brake system in the enterprise VVU ZTS Košice
Marcinko Miroslav	Effect of reduction of silver in the additional material on the quality of the soldered joint sockets in the compressor package
Markovič Marek	Surface treatment of tool active parts destined for flat working
Masárech Róbert	Evaluation of corrosion properties of surface - treated sheets for car body
Mati Lukáš	Evaluation of corrosion properties of surface - treated sheets for car body
Meglés Štefan	The influence on the mechanical properties of thin packing sheets
Melega Milan	Influence of shear clearance to quality of shear surface by precision shearing
Mihalik Miroslav	Chosen component assembly video analysis
Mikuš Tomáš	Design of hybrid mould for production of mouldings
Močková Petra	Possibilities of application hardfacing layers for increasing durability of devices
Molčan Luboš	Optimizing the selection of materials for the body components
Móricz Peter	Design of production technology for rotary symmetrical pressing with flange
Nemeth Dominik	Shrinkage of plastic composite parts in automotive industry
Németh Stanislav	Evaluation of limit deformations of AHSS steel sheets
Novák Martin	Analyse of innovation clusters in the automotive industry
Novák Peter	Evaluation of selected characteristics of zinc - enriched coatings
Očkaj Stanislav	Scan techniques in machine production
Onderčo Anton	Production technology proposal and stamping die design
Ondria Tomáš	The analysis of imperfections at joining of materials by

	combination - metal – plastics
Ongyik Tomáš	CATIA ergonomic modules application
Palaščák Matúš	Analysis of changes of surface and subsurface layers after wear supported by PC
Pangráč Juraj	Analysis of influence of resistance spot welding parameters on the properties of welded joints
Parlag Adam	Analyse and optimization of technology of compression segment matrices treatment
Pastorek Viktor	Project of laboratory workplace in CAD system
Paško Vladimír	Social and economic factors of automotive industry development in the EU
Pažur Viktor	Comparison of the deformation properties of selected materials, automotive components
Petrišin Tomáš	Modelling of prototypes of automotive components in the MAYA system
Pisarčík Marek	Analysis of information indicators in Valeo Slovakia s.r.o. company
Polačko Martin	Comparison of tool paths generated by CAM system and by workshop programming
Polák Martin	Optimisation of hobbing tool with regards to performance and cycle time
Pukluš Ivan	Tribological properties of renovation layers based on Cr
Rakoci Miroslav	Analysis of the upper edge of the cutting surface erosion Hydroabrasive
Remetei Valerián	Shell component from composite materials
Rigó Štefan	Design of pressing tool for pellets
Rimár Miroslav	Technologies of re - manufacturing and car modifications
Rosivalová Lucia	Testing of innovative Product Design methodologies
Ružička Michal	Laboratory project of automobile assemblies and components
Sabol Vladimír	Creation of innovative Product Design methodologies
Sado Ján	Analysis of properties of the joints made by Self Piercing Riveting method.
Seman Jozef	The design of the magnet housing production using CAD / CAE methods
Semančík Jaroslav	Test centre for automobile components testing
Sim Peter	Facelift of student car ICAR
Sloviak Tomáš	Substitution of the conventional automobile components materials
Szaxon Csaba	Comparison of corrosion resistance duplex and triplex coating system based on zinc
Szaxon, Peter	Changes of local mechanical properties of HVOF coatings after thermal cyclic loading
Szilágyi Gabriel	Assessment of welded joints quality of mounting pins on the

	heat exchanger
Šajša František	Optimization of determination of mechanical and plastic properties of double reduced packaging sheets
Šalamonová Petronela	Innovative machining technology for automotive components
Ščerbanič Viktor	High - tech applied in automotive production
Šmeringai Tomáš	Innovation firms for electromobility in the automotive industry and their strategies
Šofranko Michal	Application of Raman spectroscopy by recycling of polymers from scrap cars
Šofranko Štefan	Monitoring of temperature under the technological process using PC
Špirko Stanislav	Scanning of complex - shaped car components
Štec Lukáš	The application of CAD / CAM systems for milling parts in single - piece production
Šul'ak Miroslav	Effect of positioning of selected vehicles (transport accidents) to calculate the deformation energy in the car PC environment – CRASH
Šutl'ák Peter	Production workstation design in CATIA
Švihla Maroš	The proposal of placing automatization of wooden boards for a workplace in furniture industry
Tarová Simona	Computer aided design of extrusion die
Tekáč Marek	Effect of surface pretreatment on the cohesion strength of adhesive joints of automotive parts
Timko Tomáš	Study of selected properties of the coatings on powder coating composition basis
Tokarčík Rastislav	Design of contact spring production using numerical simulation
Tomaškovičová Miroslava	Local testing of mechanical properties of materials
Ujacká Erika	The study of changes properties of polymers after degradation process
Val'ko Marek	Technological proposal of driving drum production for band conveyors.
Vasil' Pavol	Manipulators application in the assembly
VincejVladimír	Renovation of engine systems under abrasive wear in practical conditions
Vojčík Matúš	FDM application of technology in the design of shaped inserts for injection molds
Vozár Martin	Milling strategies and their utilization in production of shaped surfaces
Wolf Vladimír	The wear of coated cutting tools
Zahurančík Lukáš	Assessment of corrosive environment impact on the quality of barrier coatings

Zajac Marek	Determination of cutting tool wear in relation to surface roughness
Želinský Jozef	Application of zinc - filled coatings in surface treatment of components
Žifčák Lubomír	Work standardization project in the coating workshop of the company Strojchem Svít

PhD. THESES:

Lorincová Denisa	Analysis of quality of renovation layers from aspect of degradation phenomena
Malejčík Jozef	Research of formation and tribo - corrosion properties of new protective layers
Miškanin Ján	Verification of CA technologies in the design and manufacture of engineering components selected
Olexová Mariana	Evaluation of forming limit characteristics of multiphase steel sheets
Ondáč Miroslav	Tribological properties of carbon based films
Vrabel' Marek	Research on neural network application to predict tool wear and surface integrity in process monitoring when drilling Udimet 720
Svat Peter	Research of efficient utilization of wear resistant coated HSS tools

RESEARCH AT THE DEPARTMENT**The research activities focus on:**

- ✓ Research into new modern steels in relation to requirements concerning their formability.
- ✓ Research into formability conditions and their influence on the quality and final properties of drawn parts.
- ✓ Verification of the application of progressive technologies in joining of metal materials for automotive industry.
- ✓ The optimization of machining parameters in the production of tools for thin steels and plastics production.
- ✓ Research into tribological aspects of thin coatings applied on machining tools, forming tools and implants.
- ✓ Innovation procedures in the technology of machining, evaluation of workability of construction materials and cutting properties of new tool materials, wear resistance coatings on the tools, tool wearing and energy intensity during machining.
- ✓ Development of new procedures and methods for production of samples and prototypes using various methods considering specific orientation of product design: conventional machines, rapid prototyping, rapid tooling.

Research characteristics:

Scientific and research activities of the department are diversified according to specializations of the individual department sections. The current personnel structure

of the department and its technological equipment allow for comprehensive solutions of material, technological, and designing tasks (in terms of products, tools and fixtures), including modeling, simulations and optimization of process planning and products, their experimental research, laboratory and semi - operational verification of the outcomes. The department offers the solutions in the area of metal and plastic forming, joining of materials, surface treatment of materials, machining of metal and non - metal materials, innovations of production and rapid prototyping.

PROJECTS OF THE DEPARTMENT

Title of the project	Center of research and control of technical, environmental and human risks of sustainable development of production and products in mechanical engineering
Type of the project	OP Research and Development, Implementation of knowledge and technologies obtained by research and development
Number of the project	ITMS 26220120060
Principal investigator	prof. Ing. Emil Spišák, CSc.
Time period of the project	2007 - 2013
Annotation of the project	Creation of sustainable research centers of management of technical, environmental and human risks assessment for continuous development of production and products in mechanical engineering industry. The impact will be guaranteed by generating new knowledge and its application in innovative measures aimed at increasing the competitiveness of Slovak enterprises through the introduction of new engineering products with higher added value and utility and new energy, material and environmentally effective technologies for their production. The principles and concepts of the project respect and support the implementation of the global objective of the Operational Programme "Research", which aims to modernize and streamline the system to support research and development whose outputs will contribute to the growth of regional and national economy and thus improve the terms of the educational process at high schools.
Title of the project	Unique equipment for evaluation of tribocorrosion properties of the mechanical parts surfaces
Type of the project	OP Research and Development, Implementation of knowledge and technologies obtained by research and development
Number of the project	ITMS 26220220048

Principal investigator	doc. Ing. Janette Brezinová, PhD.
Time period of the Project	2007 - 2013
Annotation of the project	The project aims to develop engineering design and construct unique equipment for evaluation of tribocorrosion properties of the mechanical parts surfaces, as well as provide device infrastructure to evaluate the characteristics of functional surfaces after tribocorrosion tests. During project solving will be make a set of samples with different types of functional surfaces, which will simulate industrial applications. Functionality of prototype constructed will be tested on this set of samples. Outcomes of surfaces evaluation made on this unique equipment will be published in scientific journals.
Title of the project	Competence center of knowledge technologies for innovation of production systems in industry and services
Type of the project	OP Research and Development, Implementation of knowledge and technologies obtained by research and development
Number of the project	ITSM 26220220155
Principal investigator	prof. Ing. Milan Kováč, DrSc.
Time period of the project	2011 - 2013
Annotation of the project	The strategic goal of the Center is to ensure the effective collaboration between academic and industrial sector in the field of research and development of knowledge technologies within the frame of the Competence Center. Among the other important goals belong: support of excellent independent applied research outputs with quality comparable to international levels, strengthening the cooperation in research and development between academia (research organizations) and industry, support of existing and building of new joint research and development facilities, building and upgrading the infrastructure for the key research and development industrial sectors of the Slovak Republic, complementary support of the international cooperation in basic and applied research with emphasis on initiatives and programs of the European Union (in particular the 7th Framework Program for Research and Development and Eureka program), increasing the attractiveness of centers supported and the region by attracting the highly qualified experts from Slovakia and abroad, establishment of competence centers of applied research and development, brokerage centers for technology transfer and knowledge to promote the partnerships between

universities, research and development organizations and the business sector (SMEs and large enterprises) in the regional centers.

NATIONAL PROJECTS

Title of the project	Application of progressive tool coatings for increasing the effectiveness and productivity of forming sheets made of modern materials
Type of the project	Grant project APVV
Number of the project	1/0682/11
Principal investigator	prof. Ing. Emil Spišák, CSc.
Time period of the project	2012 – 2015
Annotation of the project	Project solves problems of forming process optimization and increasing of forming dies lifetime by application of thin coatings to die`scontact surfaces and researches interaction of tribologic pair die surface – sheet surface. Tribologic system die surface – sheet surface will be researched from the view of their surface topology, adhesive and abrasive wearing and deformation and failure mechanisms of die and sheet coatings. Research of active parts of forming dies will be focused to system coating - die material in initial state, after deposition of conventional coating Ti - Al - N type and after deposition of new composite coatings TiN, TiCN and TiAlN after mechanical loading and after simulation of working conditions. Degradation of system coating - die material will be diagnosed using modern experimental techniques at known qualitative distribution of stresses in analysed area. The project focuses on identification of strength and structural parameters of system coating - die material that are experimentally measurable and have dominant influence to surface quality of processed sheets and total working time of forming die.
Title of the project	Research and optimization of evaluation methods of strength and plastic properties of thin tin plates
Type of the project	Grant project VEGA
Number of the project	1/0396/11
Principal investigator	prof. Ing. Emil Spišák, CSc.
Time period of the project	2011 - 2013
Annotation of the project	Mostly thin steel sheets are used in the production of food cover, tins, caps, closures and the other products made with forming process. Considering the significant changes in

tinplates production and increasing demands on their properties, there is a need to use quick evaluation methods, which allow assessing mainly their mechanical and plastic properties with low costs. On the base of actual experience, new testing methods were developed, which correspond to the strain of thin steel sheets in technological processing. The project deals with optimization of evaluation methods of strength and plastic properties of DR tinplates. Mainly limiting deformations and causes of failures of thin tinplates will be evaluated.

Title of the project	Research of superhard nanocomposite films for stressed joints under increased temperature in biomedicine
Type of the project	Grant project VEGA
Number of the project	1/0264/11
Principal investigator	doc. Ing. Eva Zdravecká, CSc.
Time period of the project	2011 - 2014
Annotation of the project	The aims of project are oriented to research super hard biocompatible films generated by plasma processes and to gradient composite coatings for applications in medicine. The coatings will be deposited on substrates with different hardness applied for implants. The project integrates research of mechanical and physical properties with an emphasis on research of tribological phenomena dynamically stressed the contacts. In the course of the project will be prepared new materials, also the deposition processes will be optimized. Evaluation of wear resistance of super hard composite films will be studied under low and elevated temperatures. Part of the project is a design model analysis of wear traces of wear and wears particles. Interconnection of tribology with microelectronics, nanotechnology, physics and medicine and cooperation between young team assumes the successful development of tribological and "smart surfaces".
Title of the project	Integration of trials, numerical simulation and neural network to predict cutting tool
Type of the project	Grant project VEGA
Number of the project	1/0279/11
Principal investigator	prof. Ing. Ildikó Maňková, CSc.
Time period of the project	2011 - 2013
Annotation of the project	Scientific goals of project are oriented to the investigation of accompanying phenomena (tool wear, cutting force,

temperature, surface roughness) when turning and drilling titanium alloy employing cutting tools from cubic boron nitride and tungsten carbide, respectively. Project is mainly oriented to the research of cutting tool wear and its identification through monitoring of cutting force and vibrations when turning and drilling. Moreover tool life determination applying shortest cutting tool tests will be developed and employed. Advanced software based on FEM and ANN will be applied for tool performance prediction in respect of required surface quality. Stress of project goals are given on integration of trials numerical modeling and neural network prediction of cutting tool performance.

Title of the project	The research of quality improving of countered shaped milling by advanced coating tools
Type of the project	Grant project VEGA
Number of the project	1/0500/12
Principal investigator	doc. Ing. Jozef Beňo, CSc.
Time period of the project	2012 - 2014
Annotation of the project	Proposed project is aimed on the research of the surface quality improvement when producing various formed surfaces employed in tool making and production of moulds. Theme of project lays the accent on machined surface texture of parts with formed surfaces, and proper quality of formed surfaces that are produced by combinations of metal removal strategies in 3D milling reduces needs of additional surface finishing operations of formed surfaces. Project has to examine and explore possibilities leading to the optimisation of the final surface quality of the formed surfaces when 3D milling by milling cutter provided with advanced tool coating and toll shape/geometry as well. Project has to apply a combination principle consisting of experiments, data measurements and data evaluation by software as well as proposal and design of new simulation models based on measured data.
Title of the project	Study of tribological aspects of formability of surface - treated steel sheets and tailored blanks.
Type of the project	Grant project VEGA
Number of the project	1/0824/12
Principal investigator	prof. Ing. Emil Evin, CSc.
Time period of the project	2012 - 2015

Annotation of the project	The concept of autobody defined in the framework of the ULSAB project pointed to opportunities for improving its performance (toughness, ability to absorb impact energy, lifetime, emissions, etc.). One of ways is application of high - strength Zn - coated steel sheets and tailored blanks; and sophisticated procedures for optimizing the mechanical properties, technological conditions and technological stamping processes (hydroforming). The subject of investigation will be the optimization of friction processes between the contact surfaces of tribological pairs "blank – die". The character, size and wear mechanism of contact surfaces of tribological pairs during particular process cycles will be diagnosed. Based on the experimental results the multi parametric purpose function (of friction coefficient, galling) will be derived for optimization of the selection of tribological properties of contact pairs "blank - die" (uncoated and coated) in relation to mechanical loading of stamping dies.
Title of the project	Implementation of new methods and forms into education of engineering technology and materials
Type of the project	Grant project KEGA
Number of the project	059TUKE - 4/2012
Principal investigator	doc. Ing. Janette Brezinová, PhD.
Time period of the project	2012 - 2014
Annotation of the project	The aim of the project is implementation an adaptive teaching system using Hypermedia to improve the process of teaching subjects in the field of engineering technology and materials. The practical outcome of the project will be creation adaptive educational web portal for attendance, distance and combined learning. The portal will also include videos of engineering technologies, tasks and tests for self - assessment students, educational materials to diagnose students' knowledge. In the frame of the project there will be established classroom for modeling and simulation of technological processes of materials processing. In the field of surface treatment of engineering materials there will be replenished corrosion laboratory for evaluation the quality of surfaces, functional, and barrier coatings. The outcome of this project will also be a monograph, focused on technological processes in engineering production and finalization treatment of products.
Title of the project	Adaptive control of manufacturing processes for a new generation of jet engine components
Type of the project	Grant project APVV
Number of the project	DO7RP - 0014 - 09

Principal investigator	prof. Ing. Ildikó Maňková, CSc.
Time period of the project	since 2009
Annotation of the project	The purpose of this call is to promote the active participation of Slovak research and development teams in the 7th Framework Programme of the European Community for research, technological development and demonstration activities through additional financing costs necessary for the implementation of FP7 proposals that have received financial support from the European Commission. The call aims to promote the participation of Slovak subjects in research and development projects .It is an open public call.

INTERNATIONAL PROJECTS

Title of the project	Application of artificial intelligence in monitoring of precision machining
Type of the project	Grant project APVV
Number of the project	SK - SRB - 0031 - 11
Principal investigator	prof. Ing. Ildikó Maňková, CSc.
Time period of the project	2012 - 2013
Annotation of the project	Proposed project is focused on use of laboratory equipment, special devices and software in both participating institution for implementation of artificial intelligence for decision making process in precision machining monitoring. Machining monitoring will be oriented to the correlation between tool wear and surface quality. Tool wear is dominant factor that influences surface quality in precision machining. Project aim is to apply and verify methods of artificial intelligence – neural network – for prediction of tool wear and machined surface quality. Data acquired from experimental work and precision machining process computer modelling will create input to neural network. To achieve project objectives, tool condition monitoring via force signals will provide. Neural network will be used for decision making process in tool condition monitoring as well as neural network will be applied for cutting tool wear prediction. Stress of project goals is given by integration of experimental trials, numerical modeling and neural network implementation to the decision making process. The main outcomes from project are oriented to the joint publications, research material collection and use of common laboratory equipments and software. Another expected outcome is focused on preparation of joint international research project.

Title of the project	Adaptive control of manufacturing processes for a new generation of jet engine components
Type of the project	7.FP, Cooperation
Number of the project	ACP7 - GA - 2008 - 213855
Principal investigator	prof. Ing. Ildikó Maňková, CSc.
Time period of the project	2008 - 2012
Annotation of the project	The manufacture of safety critical rotating components in modern aero engines is by nature very conservative. In order to achieve the required engine performance, thermal and mechanical stresses are pushed to the maximum, which in turn leaves the choice of materials to exotic super alloys. These materials are classed as difficult to machine under normal circumstances, but when added to the changes in mechanical properties which occur naturally from part to part, consequently variable and often unpredictable tool life, and the ever present possibility of random and unexpected process anomalies, machining processes can never be fully optimised. Stringent legislative controls are placed on safety critical component manufacture to ensure that parts entering service will function correctly and safely to a declared service life, and in declaring the service life for such a part, the machinability issues stated above have to be taken into consideration. Hence manufacturing process parameters are often reduced or tools are changed early to ensure part surface integrity. The industry method adopted, is to “freeze” to process following process qualification to first article inspection, and successful part validation via laboratory examination and testing. Once frozen, no changes to process parameters are permitted without time consuming and costly re - validation. ACCENT will allow the European Aero Engine manufacturers to improve their competitiveness by applying adaptive control techniques to the manufacture of their components. Being able to adapt the machining process to the constantly changing tool and component conditions whilst operating in a multi - dimensional “approved process window”, processes will be optimised to the prevailing conditions and no longer “frozen”. Benefits will be seen in terms of reduced part manufacturing process time, more consistent part quality in terms of geometry, surface and sub - surface properties, tool usage optimisation, elimination of costly part re - validation due to small process changes, and the possibility to improve component design due to optimised machined surfaces.
Title of the project	Technological and design aspect of extrusion and injection moulding of thermoplastic polymer composites and nanocomposites

Type of the project	7.FP
Number of the project	FP7 - PEOPLE - 2010 - IRSES / 269177
Principal investigator	prof. Ing. František Greškovič, CSc.
Time period of the project	2009 - 2013
Annotation of the project	The most important objective of the project is to strengthen the research and didactic potential of researchers, particularly early stage researchers employed by universities acceding to the project. Owing to training, seminars, and research, the researchers will acquire new experience in the field of processing of advanced thermoplastic polymer composites by means of machines with screw plasticizing systems of innovative and original design. The staff exchange as well as the synergy and the mutual complementation will contribute to the transfer of knowledge between the individual partners, i.e. between European Union research centres and a third country university in Ukraine taking part in the project. Work will be implemented in four Work Packages. Each partner will be responsible for one issue. Single screw extrusion of thermoplastic composites will be conducted at the Lublin University of Technology (Poland), while twin screw extrusion – at the West Saxon University of Applied Science in Zwickau (Germany). Actions connected with injection moulding will be carried out at the Technical University of Kosice (Slovakia). Experiments on the properties of thermoplastic composites will be performed at the Lviv <i>Polytechnic</i> National University (Ukraine). The expected results include: knowledge transfer, improving the qualifications of staff members, initiating and strengthening cooperation at a high scientific and technological level, and defining the vision of the further development of research on extrusion and injection moulding of advanced materials and the design of plasticizing systems in single - and twin - screw extruders, which should result in new research projects. In consequence, a permanent, long - term collaboration with Ukraine will be developed. The consortium will become more open to future cooperation with other research institutions in the European Union and worldwide.
Title of the project	Precision machining of hardened active surfaces as process combination of hard machining and hard surface burnishing
Type of the project	Grant project APVV DAAD
Number of the project	0298/2008/SMS
Principal investigator	doc. Ing. Jozef Beňo, CSc.

Time period of the project	2010 - 2012
Annotation of the project	Hard machining as innovative technology has significant effect on industrial environment because of reducing of use of coolant and lubricants. Project has been aimed to combine processes of precision machining with surface burnishing of active surfaces which build up engineering components. Project objectives were aimed to investigate relationships between surface properties of hard machined parts with process data which control hard surface burnishing. To improve surface properties, initial surface roughnesses as well as surface hardening have been studied. Based on project objectives, cutting force relationships and tribological behaviour of hard burnished surfaces have been studied. Results of project predict properties of active surfaces in their applications.
Title of the project	Magneto - abrasive surface treatment as a method to increase performance of spindle axis cutting tools
Type of the project	MŠ DAAD
Number of the project	DAAD
Principal investigator	doc. Ing. Jozef Beňo, CSc.
Time period of the project	2012 - 2013
Annotation of the project	Project deals with investigation of effects of tool edge preparation upon relevant process phenomena when machining. Preparation of tool edge depends on factors which are affected either by their production as well as by subsequent coating. Main objective of project is to investigate effect of active tool geometry on phenomena characterising turning and drilling operations. Microgeometry of tool edges as their rounding and chamfering are used to characterise tool preparation. Further quantities being studied in project are tool edge sharpness and tool edge coating. Tool preparation is investigated in terms of quantities as forces, tool wear and surface roughness when turning and drilling

VISITS OF STAFF MEMBERS TO FOREIGN INSTITUTIONS

Employees and students	Country
Spišák Emil, prof. Ing., CSc	Poland
Slota Ján, doc. Ing., PhD.	Poland
Kráľ Ján, doc. Ing., CSc.	Poland
Gajdoš Ivan, Ing., PhD.	Poland
Maňková, Ildikó, prof. Ing., CSc.	Germany
	UK
	Serbia

Beňo Jozef, doc. Ing., CSc.

Zdraveká Eva, doc. Ing., CSc.

Duleba Branislav, Ing.

Švanter Peter, Ing.

Bogdan Dávid, Ing.

Lorincová Denisa, Ing.

Malejčík Jozef, Ing.

Ondáč Miroslav, Ing.

Džugan Ján, Ing.

Vrabel' Marek, Ing.

Stahovec Jozef, Ing.

Kandráč Ladislav, Ing.

Germany

Serbia

Portugal

Poland

Poland

Poland

Poland

Poland

Poland

Poland

UK

Germany

Hungary

Germany

Poland

MEMBERSHIP IN INTERNATIONAL PROFESSIONAL ORGANISATIONS

International Deep - Drawing Research Group

Emil Spišák, prof. Ing., CSc.

Journal Tribologia (PL)

Eva Zdravecká, doc. Ing., CSc.

PUBLICATIONS

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- [11] JANKURA, Daniel - DRAGANOVSKÁ, Dagmar: **Expertízna analýza náterových systémov nádrží LPHrealizovaná po ročnej prevádzke**, Košice: TU - 2012. - 14 s.

Research reports

- [1] BREZINOVÁ, Janette - GUZANOVÁ, Anna - DRAGANOVSKÁ, Dagmar - KAŠČÁK, Ľuboš - ÁBEL, Milan - , TOMÁŠ, Miroslav - EGRI, Marián - VIŇÁŠ, Ján - JANKURA, Daniel - MALEJČÍK, Jozef - LORINCOVÁ, Denisa: **Výskum tvorby a vlastností renovačných vrstiev zariadení exponovaných v extrémnych tribokorózných podmienkach**, Záverečná správa č. 1051010, Košice: TU - 2012. - 12 s..



Department of Industrial Engineering and Management



Contact

The head: Kováč Jozef,
prof. Ing., CSc.
E - mail: jozef.kovac@tuke.sk
Address: Němcovej 32,
041 00 Košice, SR
Phone no.: +421 55602 3233
+421 55 602 2713
Fax.: +421 55 602 3233



Staff

- Professors: 2
- Assoc. Professors: 3
- Assist. Professors: 7
- Researchers: 2

Activities at the department

Date	Title of the event, activity characterizing the life at the department in 2012
6/2012	Journal Transfer inovácií 22/2012
7/2012	Journal Transfer inovácií 23/2012
12/2012	Journal Transfer inovácií 24/2012
12/2012	15th International Scientific Conference Trends and innovative approaches in business processes, Košice © 2012

EDUCATION AT THE DEPARTMENT

STUDY PROGRAMS

Bachelor's degree:

- Industrial Engineering

Master's degree:

- Industrial Engineering

PhD. degree:

- Industrial Engineering

Number of the students

(till 30.10.2012) on the study programs guaranteed by the department:

Bachelor's degree:

- 150 internal form of study
- 24 external form of study

Master's degree:

- 86 internal form of study
- 40 external form of study

PhD. degree::

- 8 internal form of study
- 19 external form of study

Number of the graduates (2011/2012)

on the study programs guaranteed by the department:

Bachelor's degree:

- 48 internal form of study
- 15 external form of study

Master's degree:

- 52 internal form of study
- 11 external form of study

PhD. degree::

- 4 internal form of study
- 4 external form of study

GRADUATE PROFILE

BACHELOR'S PROGRAM (Bc.)

Industrial Engineering

The Bachelor of Industrial Engineering program objective is to help students apply technical, technological, economical and mathematical principles to the design, improvement, and installation of integrated systems of people, material, information, and energy.

MASTER'S PROGRAMS (Ing.)**Industrial Engineering**

The graduate gains complete university education focused on planning, designing, implementing and managing production systems and also creativity development in engineering projects or processes. He has deep knowledge of natural sciences, technical, technological disciplines and humanities with expertise in industrial engineering, company management, production management, business economics, theoretical knowledge of operation and system analysis, logistics, personal management, investment, finance, innovation, information management, etc. The graduate is ready either to continue his study in postgraduate degree and develop his research career in industrial management, or to enter job market immediately. He will successfully perform as a middle or top manager in organisations within various sectors of industry requiring the synergy of managerial, economical, technical and soft skills and knowledge.

PhD. PROGRAMS (PhD.)**Industrial Engineering**

The graduate gains complex university education in Industrial Engineering. He has mastered research and development methods of gaining knowledge autonomously. He will be able to develop creative methods in the field of industrial Engineering. The graduate will be successful in the top managerial positions in various types of organisations, consulting companies and universities, in both research and teaching careers.

LIST OF SUBJECTS GUARANTEED BY THE DEPARTMENT**Industrial Engineering**

- | | |
|---|--|
| ✓ Accounting | ✓ Management of Changes |
| ✓ Automation of Production | ✓ Marketing |
| ✓ Business Analysis | ✓ Marketing Strategy of Enterprises |
| ✓ Business Economics | ✓ Operations Management |
| ✓ Business Information System | ✓ Personal Management |
| ✓ Business Management | ✓ Project Management |
| ✓ Business Strategies of Small and Middle Enterprises | ✓ Psychology in the Managerial Work |
| ✓ Costs and Setting Prices | ✓ Taxation |
| ✓ Customer Management | ✓ Team Work |
| ✓ Design of Manufacturing Processes and Systems | ✓ The Basics of Communication |
| ✓ Ergonomics | ✓ The Basics of Industrial Engineering |
| ✓ Financial and Economic Analysis | ✓ The Basics of Law |
| ✓ General Economic Theory | ✓ The Basics of Management |
| | ✓ The Basics of Production Design |
| | ✓ The Basics of Work Rationalization |

GRADUATE THESES

BACHELOR'S THESES:

Balog Jaroslav	Optimization of inventory in the process of maintenance - repair activities in the selected company
Baloghová Viktória	Customer Relationship Management
Benčíková Kristína	Reconfiguring analysis of production in the company
Béreš Karol	Analysis of the causes and eliminating errors in the process of production of the Dynamo sheet
Berková Zuzana (rod. Plačková)	Proposal for improving business performance
Čontošová Mária	Process map of the industrial company
Delejšová Veronika	Analysis of errors in the selected production process in industrial companies
Dic Michal	Creating a business plan business
Dobrocká Slávka (rod. Uličná)	Preparation for the introduction of quality management system
Dubík Eduard	Proposal of the optimization processes in company
Evin Tomáš	Product portfolio - signage production facilities
Fekiač Miroslav	Designing reconfigurable manufacturing systems from modular profiles and components
Ferenčíková Katarína	Time studies and their usability in dismantling operations
Gaspareková Monika	Optimization the relationships in the supply chain in selected company
Gergelyová Lucia (rod. Červeňáková)	The simulation model of production in company KIPECH
Germeková Dana	The elements of lean manufacturing and possibilities of their use in selected company
Grega Vladimír	Information systems for simulation of manufacturing systems in virtual reality environment
Harcsár Eva (rod. Juhászová)	Process improvement using Six Sigma methodology
Hegedúsová Monika	System of design pricing in business
Janáčiková Marta	Usage of teamwork in the human resource management area
Jellúš Erik	Stock logistics optimization in company
Jendroľová Andrea	Innovative methods and techniques for production systems optimization
Kleinová Veronika	Proposal management and organization of production in selected
Koval' Karol	Creation of simulation models of selected species production

Maďariová Monika	Implementation of visual management in the innovation of laboratory processes
Mattová Ivana	Application of torque - observation in the production system
Molčan Vladimír	Evaluation of advantages in the small water power station
Moroz Richard	Strategies of company management in crisis
Nagyová Lívia	Performance evaluation of company processes by the method Balanced Scorecard
Noga Michal	Case study creation a business plan in the establishment of a new company
Olejník Tomáš	Comparison of methods for logistic supply in company
Oravec František	Optimization of the processing of information in providing services in the selected companies
Örmezeyová Mária	Sourcing application in an industrial company
Pečeňák Marián	The introduction of parking systems based on new concepts set out by the urban agglomeration
Petrovičová Miriama	Application of innovative improvements in chosen company
Poláková Katarína	Analysis of the company's financial situation
Poláková Oľga	Innovation in information and communication processes in business
Popovič Radko	Analysis of the production process using the method CPM
Probala Daniel	Strategic planning in selected company
Rusnák Ján	Analysis of welding process on pickling link
Sabol Rastislav	Optimization activities in the context of increasing competitiveness of the enterprise
Sesztáková Klaudia	Optimization of distribution system in a multinational company
Spišáková Veronika	Innovation of packaging systems in an industrial company
Stupianska Lucia	Management of selected Internal operations
Šturm Milan	The model of production system designed in the virtual reality environment
Tarbaj Tibor	The procedure for the preparation of project documentation of the new logistics center
Troško Lóránt	Ergonomic rationalization of selected work activity
Valent Milan	TPM deployment options in a selected company
Vaník Lukáš	Software for manual production systems
Verčimák Pavol	Development of budgeting in company

MASTER'S THESES:

Bariličová Viera	Tools to enhance the competitiveness of foreign entities in domestic markets
Belušák Peter	Management for integrated management systems in small

	and medium enterprises
Bito Daniel	Application of selected methods in the management of the production process
Bodnár Matej	Company investments financed by leasing
Bul'ková Henrieta	Operational management of business processes
Butkovič Pavol	Rating errors manufacturing machine
Čech Lukáš	Increasing production efficiency by applying the synergic effect
Čigášová Katarína	Innovation in business processes to increase customer value
Čuchta Ján	Modelling internal processes of the selected company
Čupeľa Daniel	Innovation of the control system of slitting line
Čurilla Radoslav	Model evaluation of reference data for new product development
Dobrovič Daniel	Application of Basic MOST in conditions of selected dismantling process
Dóry Kristián	Technical and economical evaluation of mobile phones dismantling
Drotárová Lenka	The analysis and optimization of logistics chain bound to the selected product
Emődiová Henrieta	Optimization of maintenance costs in the enterprise
Filip Ladislav	Automate the testing and labeling of RCD
Gajanec Stanislav	Performance analysis in an industrial company
Gajdoš Igor	Application of project management in implementation of information system in selected company
Gajdošová Beáta	Modern storage systems, pallet and machinery production
Gáll Matúš	Economic and financial evaluation of a company investment
Gášparík Tomáš	Product Development in CAD systems
Gregová Eva	Competitiveness of the companies operating in the Slovak business environment
Griger Ondrej	Systems and tools for improvement of processes and possibilities of their implementation in selected production company
Humeňaj Marek	Risk analysis in assessing the effectiveness of a company investment
Isza Július	Innovative project of car dashboards
Janeková Iveta	Marketing of specificity modernization of production systems of mass production
Jareková Miroslava	Innovative actions in selected company
Jenčíková Ľubomíra	Trends in engineering industry since 2004
Jurek Slavomír	The optimization of the process of contract management in the selected company
Kalafusová Lenka	Analysis of risk factors in the company using the Balanced Scorecard

Kandráčová Lucia	Use reporting as a supporting tool for decision making in business
Kažimírová Soňa	New technologies for treatment and treatment profile in a semi - mechanical engineering
Kičiňková Marcela	Upgrading planning publicity and awareness projects financed from EU funds
Kliment Marek	Modelling of internal processes by the application of Petri nets
Kobanová Laura	Simulation of the manufacturing process of end shield
Komanický Lukáš	Proposal for measures to optimize the production chain in selected company
Kulinová Martina	Realisation of graphical methods for motion studies in the work process
Kurincová Andrea	Proposal of innovation of calibration laboratory
Kurincová Renáta	Models of production process reconfiguring in the company
Kviatková Soňa	The material flow optimization in the production of the selected product
Lacková Jana	Application of project management in the company
Lajgútová Lucia	Optimization activities in the area of the distribution logistics in the selected companies
Likavcová Miriama	System analysis in business process management
Liptáková Alžbeta	Costing and pricing policies in selected enterprises
Loparčák Tomáš	Proposal of production innovation in an industrial company
Mindžáková Júlia	Innovation of selected activities of the value chain of manufacturing electrical products
Olexová Mária	Implementation of innovative trends in the company's management
Ondrejová Petra	Improving business processes selected innovative methods
Pačai Kristián	Optimization of work in manufacturing enterprise
Pacovská Miroslava	Application of selected methods of workload analysis of production workers
Petrík Martin	Optimizing the use of production devices
Plichtová Monika	Application of CRM systems in the corporate practice
Pollák Jozef	Verification of manual assembly in the laboratory conditions.
Salokyová Lucia	Elements usage of Lean Enterprise in concrete conditions.
Sanetrik Erik	Innovation of subcontracting business systems
Sedlák Jaroslav	Project solution of production disposition in the selected company
Sedláková Katarína	Integration of logistics flow injected into assembler.
Sládek Lenka	Workload reduction of chosen work activities
Šmida Tomáš	Innovation of business processes and services in the customer oriented companies
Tarajčák Jaroslav	Comparison of CPM and PERT methods - advantages and

	disadvantages of using in the selected enterprise
Vančák Lukáš	Applying Kaizen methods to optimize production in selected enterprises
Varga Tomáš	Ergonomic optimization of manual work activity
Žukovič Matej	Controlling as the tool of effective business management
PhD. THESES:	
Čupová Monika	Implementation of innovative methods and techniques of Lean manufacturing in the company GETRAG, s.r.o.
Kádár Gabriel	Implementation of innovation methods and techniques of competitiveness improvement in selected Slovak enterprises
Käfer Ronald	Stock management and production control on base method kanban
Kočiš Rastislav	Experimental verification hardware and software virtual reality of designing of production system
Ondrejová Lucia	Ergonomic designing of non automated assembly workplaces
Petričová Zuzana	Exact methodology for assessing the competitiveness of products
Petríková Andrea	Application of logistics methods when restructuring company processes
Ruhle Otto	Project for application of marketing in realization of products in global markets
Takáč Peter	Verification of simulation models of business processes
Wollny Rafael	Requirements, Success Factors and Characteristics of an Integrated Product Recall Management

RESEARCH AT THE DEPARTMENT

Area of research:

- ✓ Integrated designing of production systems on the physical and virtual modelling base.
- ✓ Methods and techniques of experimental modeling of in - plant manufacturing and non - manufacturing processes.
- ✓ Technology to reduce the occurrence of cyanobacteria in stagnant water.

PROJECTS OF THE DEPARTMENT

Title of the project	Implementation and modification of technology to reduce the occurrence of cyanobacteria in stagnant waters
Type of the project	OPVaV
Number of the project	ITMS: 26220220028
Principal investigator	prof. Ing. Dušan Šebo, PhD.

Time period of the project	2010 - 2013
Annotation of the project	Main aim of project is to apply unconventional technology to reduce eutrophication of stagnant water, contaminated mainly by cyanobacteria and lower eyelids. Project activities are focused on the modification and adaptation of patented equipment, which was researched for wastewater treatment in the previous work of the Department of Environmental and Process Control. The device is used for experimental purposes and doctoral education in environmental and industrial engineering. Expected outcomes are mainly in verification of technology, but also in new patent solutions, publicity activities and transfer of the acquired knowledge into practice.
Title of the project	Center for research of control of technical, environmental and human risks for permanent development of production and products in mechanical engineering - Integrated designing of production systems on the physical and virtual modelling base.
Type of the project	OPVaV
Number of the project	ITMS: 26220120060
Principal investigator	prof. Ing. Jozef Kováč, CSc.
Time period of the project	2010 - 2013
Annotation of the project	Integrated designing of production systems on the physical and virtual modelling base is added in specific goal 3: Designing innovation and implementation of production system, high - tech products and development of knowledge intense service for elimination the innovation project risks within formation the research excellence centre in SjF TU of Košice. The solution has to contribute to extension the knowledge in the area of integrated designing of production systems through experimental laboratory activities supported with sophisticated high - tech technologies.
Title of the project	Methods and techniques of experimental modeling of in - plant manufacturing and non - manufacturing processes
Type of the project	VEGA
Number of the project	1/0102/11
Principal investigator	doc. Ing, Peter Trebuňa, PhD.
Time period of the project	2011 - 2014

Annotation of the project

The project aims to put the application of methods of experimental modeling and development of new methods of investigation and analysis of internal processes, the use of new diagnostic methods for prediction of risk situations as well as further extending the possibilities for using conventional methods. The research project should increase the competitiveness of production in machinery industry, which requires a further substantial increase in educational level creative staff development, research, design in general, but also graduates of all levels of engineering study courses, to prevent adverse situations during the operation and survival of engineering companies. The above objectives should help to avert the emergence of unexpected situations such as non-productive in the manufacturing sector prior to the existence of risk. This is the main objective, if it should contribute to basic research - oriented than the proposed project in the sphere of production to the sphere of non-production management.

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INSTITUTE OF MACHINES AND MACHINERY DESIGN

- Department of Production Systems and Robotics
- Department of Machine Design, Transport and Logistics





**Department of
Production Systems
and Robotics**



Contact

The head: Mikuláš Hajduk,
prof. Ing., PhD.
E - mail: mikulas.hajduk@tuke.sk
Address: B. Němcovej 32,
042 00 Košice, SR
Phone no.: +421 55 602 2196



Staff

- | | |
|-----------------------|------------------------|
| • Professors: | 3 |
| • Assoc. Professors: | 3 |
| • Assist. Professors: | 7 |
| • Researchers: | 3 |
| • PhD. Students: | 6 internal, 6 external |

Activities at the department

Date	Title of the event, activity characterizing the life at the department in 2012
3/2012	Lecture of experts from the practice - Matador group
4/2012	Lecture of expert from the practice - Jaromír Jezný, Ing., PhD., ZŤS VVÚ Košicea.s.
4/2012	ISTROBOT competition – Lucia Gibaľová, Jozef Kmec, Peter Béreš
5/2012	ŠVOČ – student's scientific and professional activity (1. place – Peter Tkáč, 2. place – Ondrej Šimčák, 3. place – Jozef Sepeši)
5/2012	Lecture of expert from the practice – Ladislav Vargovčík, Ing. PhD., ZŤS VVÚ Košicea.s.
6/2012	Workshop: CluStrat – Fostering innovation through new cluster concepts to support emerging industries and cross - section themes
6/2012	New associate professor – Jozef Svetlík, doc. Ing., PhD.
11/2012	Robtep 2012 – International conference
11/2012	New associate professor – Marek Sukop, doc. Ing., PhD.
11/2012	FLL - First Lego League Competition
12/2012	Lecture of expert from the practice – Ivan Frolo, Ing., Strojimpexs.r.o.
12/2012	Engineering award 2011/2012 – Ing. Peter Tkáč

EDUCATION AT THE DEPARTMENT

STUDY PROGRAMS

Bachelor's degree:

- **Control and diagnostics of production, robotic and transport technology**

Number of the students

(till 31. 01. 2013)

on the study programs guaranteed by the department:

second year of study:

- 17 internal form of study

third year of study:

- 13 internal form of study
- 4 external form of study

Number of the graduates (2011/2012)

on the study programs guaranteed by the department:

- 12 students in the internal form of bachelor study
- 12 students in the external form of bachelor study

Master's degree:

- Robotic
- Production machinery and equipment

Number of the students (till 31. 01. 2013)

on the study programs guaranteed by the department:

first year of study:

- 17 internal form of study
- 15 external form of study

second year of studies:

- 18 internal form of study
- 8 external form of study

Number of the graduates (2011/2012)

on the study programs guaranteed by the department:

- 20 students in the internal form of engineering study

PhD. degree:

- Production systems

Number of the students

(till 31. 01. 2013)

on the study programs guaranteed by the department:

Internal students: 6

External students: 6

Number of the graduates (2011/2012)

on the study programs guaranteed by the department:

- 3 PhD. students in the internal form of study (defended PhD. thesis)
- 6 PhD. students in the external form of study (defended PhD. thesis)

GRADUATE PROFILE

BACHELOR'S PROGRAM (Bc.)

Control and diagnostics of production, robotic and transport technology

Study program Control and diagnostics of production, transport and robotic technology is an innovation of the study program The operation and maintenance of machines of bachelor's degree in Mechanical Engineering Faculty. The program continues to support the fields of the practice of industrial profile, quality and productivity. It provides high theoretical and practical experience with technology in the field of profiling. It focuses on the acquisition of management skills, innovation and renewal of machinery and equipment, namely, manufacturing, transport and robotic techniques.

MASTER'S PROGRAMS (Ing.)

Robotic

Mechanical engineer profiled for the design, application and operation of automated equipment (robots) and systems. By self - profiling (selecting subjects) as a specialist designer (robot theory, design methodology, design and construction, management and programming, diagnostics and experimental methods), designer (theory of production systems, design methodology, design and programming, diagnostics and experimental methods), (an robot theory, theory of operation, methods of operation and service, diagnostics and maintenance, management and programming, experimental methods). The summary of knowledge and skills include the application of CA technologies, management of engineering activities, management of operational activities, business management and personnel management.

Production machinery and equipment

Mechanical engineer profiled for the design, application and operation of machinery and equipment for engineering (machining, forming, casting, welding, locksmith standing) and tools (food, wood processing machines) and production systems. By self - profiling (selecting subjects) as a specialist designer (the theory of production machinery, design methodology, design and construction, methods of automation, control and programming, diagnostics and experimental methods), establishment (production machines theory, theory of operation, traffic handling methodology, diagnostics and maintenance, management and programming, experimental methods), manufacturer with deep knowledge of the design (the development of talent, knowledge and skills in shaping, humanizing technology and creating a working environment). The summary of knowledge and skills include the application of CA technologies, management of engineering activities, management of operational activities, business management and personnel management.

PhD. PROGRAM (PhD.)

Production systems

Deepening understanding of the engineering study by the independent study program of elaboration and extension of theoretical approaches and methodologies in the field of engineering structural design and manufacturing robotic technology based on innovative concepts from the design of robot cells and flexible manufacturing systems - based on innovation system structures, from models of the production management systems based on optimization of operating conditions. Deepening knowledge and skills for individual activity, synthesis and optimization of the proposed facilities and systems taking into account the interrelationships and compatibility of design modules, engines, control systems and diagnostic methods with implementation of computer intelligence and relation of "man - machine - environment". Deepening the knowledge of constructing concepts and principles of technical solutions and their experimental models and their verification using virtual and real models. The scientific approach of development of dissertation topic is based on the use of modern methods of creating innovative solutions (CAI - TRIZ) supported by means of CA technologies (including virtual prototyping and dimensional calculations, product lifecycle management,

modeling and simulation, ...). Specialization of knowledge oriented to the construction of machines, robots and manufacturing systems is bound to direct involvement in scientific projects of training center with a high degree of application of their own creativity.

LIST OF SUBJECTS GUARANTEED BY THE DEPARTMENT

- ✓ Automated Production Systems
- ✓ Basics of Fluid Mechanisms
- ✓ Basics of Informatics
- ✓ Basics of Service and Maintenance
- ✓ Computer Seminar
- ✓ Construction and Design of Interoperable Manipulation
- ✓ Design Management and Marketing
- ✓ Diploma Thesis
- ✓ Diploma Project
- ✓ Evolution Trends in Robotics
- ✓ Evolution Trends in Production Technology
- ✓ Experimental Methods
- ✓ Final Work
- ✓ Final Project
- ✓ Fluid Mechanisms
- ✓ Food Industry Machines
- ✓ Food Production Automation
- ✓ History of Technique Design
- ✓ Information Systems in Maintenance
- ✓ Innovation and Renewal of Machinery and Devices
- ✓ Laboratory Practice
- ✓ Machines and Robots Programming
- ✓ Machines and Devices Design Methodology
- ✓ Machines Design
- ✓ Machine Tools Automation
- ✓ Machine Tools Building Theory
- ✓ Machine Tools Control Techniques
- ✓ Maintenance of Machinery and Devices
- ✓ Maintenance and Diagnostics of Machine Tools
- ✓ Maintenance and Diagnostics of Robots
- ✓ Manipulation Technology for Food Production
- ✓ Methodology of Designing and Technologicality of Production Machines Construction
- ✓ Modelling of Technical Structures
- ✓ Modules for Construction of Production Machinery and Equipment
- ✓ Operation of Food - processing Machines
- ✓ Operation of Machinery and Devices
- ✓ Operation of Production Systems
- ✓ Operation of Robotic Systems
- ✓ Peripheral Devices of Production systems
- ✓ Presentation Photography
- ✓ Production Technology
- ✓ Production Systems
- ✓ Production Systems Design
- ✓ Project Management
- ✓ Propagation Techniques
- ✓ Robotics
- ✓ Robotic and Handling Technology for Production Systems
- ✓ Robot Control
- ✓ Robotic Systems
- ✓ Robotics Systems in Automobile Production
- ✓ Robotic Technology
- ✓ Semestral Project
- ✓ Service Robots
- ✓ Service Systems
- ✓ Technical Diagnostic
- ✓ Technology for Integrated Production
- ✓ Theory of Robot Design
- ✓ Thesis Seminar
- ✓ Unconventional Food Machines
- ✓ Unconventional Production Machines

GRADUATE THESES

BACHELOR'S THESES:

Control and diagnostics of production, robotic and transport technology

Bányász Arnold	Safety of operation line dividing plates
Béreš René	The scheme of a service robot's mobile platform used during railway accidents
Čirip Juraj	Conceptual design of modular gripper for DUO robot
Dely Rastislav	Proposal for low cost of maintenance resources
Hatrák Marek	Proposal of TPM for the Manufacturing Cell
Hreha Miroslav	Project of safety robotic workstation security
Kubaško Peter	Safety of retrofitting machines and equipments
Mizia Lukáš	Conceptual design technological head for the robot SEF 2
Mojdis Marek	TPM implementation in production plant
Molnár Vladimír	Program for optimizing lubrication intervals
Očovay Richard	Program for the determination of machine renewal time
Papcun Henrich	Draft recovery management system for regenerative electric locomotives
PapugaTomáš	Increase the reliability of a buffer traffic for machine tools
Pastrnák Rudolf	Proposal of technological efector for robot and intelligence position table cooperation
Petrila Rastislav	Renewal of motor locomotive's controlling and regulation
Pillár Ľuboš	System design for regenerative recovery of chosen NC machine
Sivačko Viktor	System Design regenerative recovery of conventional machines
Smolko Michal	Effect of human factors to ensure the reliability of production
Špak Michal	The risk determination in operation of the machine
Sukop Dušan	Increasing of welding workstations intelligence based on 3D visual systems
Svitaň Ľuboš	Regenerative recovery system design selected conventional machines
Szabó Vojtech	Maintenance program for preventive maintenance
Urbančík Kristián	Equipment service robot used during railway accidents
Voda Viktor	Construction methods to reduce operational risks

MASTER'S THESES:

Production machinery and equipment

Bañacký Jozef	Module of Wheel with Reductor SPINEA
Baranik Dušan	A service robot accessories for fire rescue system by auto accident
Belko Radoslav	Visual systems of industrial robots

Bereš Róbert	Analysis of the influence of spindle bearing run - out at the workpiece accuracy on the virtual model of centre lathe
Bodnár Vladimír	Intelligent robot arm project for co - operation with human
Dorocák Tomáš	Design CNC Engraving Machine
Dudič Daniel	Cooperation of service robots in handling operations
Duľa Martin	Analysis of the forced vibrations of classical designed milling centre on its virtual model
Ďuraš Štefan	Analysis of the influence of spindle bearing run - out at the workpiece accuracy on the virtual model of classical designed milling centre
GizelaŠtefan	Structural design of machine for crushing fruit and vegetables
Hric Radovan	Proposal for 3D Scanning Station
Juhás Róbert	Feeding device for pneumatic table - top press machine
Olejár Peter	Design of Rotary Motion Module
Pollák Michal	Design of pneumatic table - top press machine
Sepeši Jozef	The proposal of automated production line for assembling door locks
Sepeši Peter	Proposal for Positionable Table of Pneumatic Compactor
Šimčák Ondrej	Universal Fixture for Mounting of Automotive Transmissions
Titka Attila	Proposal a robotic workstation in a virtual environment
Tkáč Peter	Walking Mobile Service Robot Chassis
Tokár Michal	The Design of Rotary Motion Module

PhD. THESES:**Production systems**

Belovežčík Andrej	Structural optimization of flexible manufacturing system in the virtual reality environment
Dulenčin Peter	Creating 3D models of real objects by digital photogrammetry
Durkáč Viktor	Implementation of the tool path optimization module for drilling of multiple holes in the CAD system Pro / Engineer
Haun Matthias	Conceptualization of an artificial cognition to implementation of a cognitive system, using Cognitive computing technologies and their validation by the simulation
Jendrejová Miroslava	Implementation of the criteria of industrial design into the design of machine tools in the virtual prototyping stage
Kuderjavý Peter	Proposal of mounting workstations based on automated rotary units
Marko Ľuboš	Lower limbs exoskeleton's control design
Tomči Peter	A project of grippers and of system for their automatic exchange
Vargovčík Ladislav	Design of mobile platform for service robot for rescue works

RESEARCH AT THE DEPARTMENT

Area of research:

Power machines and equipment

- ✓ Multirobotics systems profilation
- ✓ Virtual prototyping of machining machines
- ✓ Methods and tools for design of service robots
- ✓ Modular reconfigurable robotic systems
- ✓ Development of modular principles for constructing of handling systems
- ✓ Performance improving of production systems based on reconfigurability and implementation of real – time monitoring in cooperation of computer intelligence
- ✓ Multifunction positionable modules for production robotic technology

Research characteristics:

The main fields of research of the Department of Production Systems and Robotics are: service, humanoid and industrial robotics, production technology and reconfigurable manufacturing systems. Research tasks in the field of robotics are oriented to address current needs such as multirobotic systems and solutions of mutual co - operation of robots, robotic systems based on modularity and rekonfigurability as well as research in the field of intelligent robotics systems.

The research is focused on the issues of working precision of machine tools, to evaluate the technical level of production lines, as well as the development of expert systems for dealing with diagnostic of machinery and equipment.

The Department of Manufacturing Engineering and Robotics supports research in education in the field of manufacturing machines and robots by creating and implementing e - learning form of education using virtual laboratories connectable via the internet.

Areas of expertises:

- | | |
|--|--|
| ✓ Multirobotic systems and robot cooperation | ✓ Virtual laboratories |
| ✓ Intelligent robotic systems | ✓ Virtual models |
| ✓ Kinematics structures | ✓ Modular reconfigurable robotic systems |
| ✓ Construction of production machines and robots | ✓ Intelligent manufacturing systems |

PROJECTS OF THE INSTITUTE

NATIONAL PROJECTS

Title of the project Principles of cooperation and profiling of multirobotic systems

Type of the project VEGA

Number of the project 1/0810/11

Principal investigator	Mikuláš Hajduk, prof. Ing., PhD.
Time period of the project	2011 - 2013
Annotation of the project	The project focuses on the methodology of creating structures of multirobotic systems as a new paradigm of application development strategies, solutions of robots and mutual coordination of the robots and cooperation in carrying out manipulation tasks. The project forms a methodology that will shape and assign tasks to each robot based on their hierarchical position, kinematics, function, location and so on. The goal is to find an optimal parallel operation of several robots to ensure the implementation of the tasks of handling the same object manipulation and / or logically bound handling operations. Such solutions are being used in automate supply chain and service activities of manufacturing and assembly systems.
Title of the project	Research and development of new kinematic structures based on rotary modules for the use in manufacturing construction machinery and robots
Type of the project	VEGA
Number of the project	1/0854/12
Principal investigator	Peter Demeč, prof. Ing., CSc.
Time period of the project	2012 - 2014
Annotation of the project	The project is focused on research and development of new kinematic structures based on rotary modules for use in manufacturing of construction machinery and robots. The leitmotif of the project is research in the possibility of replacement of linear motion units in the structure of production machines and robots by rotary modules while preserving, respectively extending of the work area, improving accessibility in confined spaces and improvement of static, kinematic, dynamic and precision parameters in comparison with machines or robots based on classic principle of serial kinematics with linear units. Research of new kinematic structures will be implemented by a combination of virtual prototyping and verification of analytical solutions at a specially developed experimental prototype machine of a new concept. There will be discussed the matter of possible field for the use of innovative machines or robots in practice.
Title of the project	e - learning of robotics with implementation of a virtual laboratory with remote management of real facilities on Internet base

Type of the project	KEGA
Number of the project	047TUKE - 4/2011
Principal investigator	Mikuláš Hajduk, prof. Ing., PhD.
Time period of the project	2011 - 2013
Annotation of the project	With the development of web technologies and virtual environments and multimedia applications there is an increasing importance of using the technologies in education. The possibility of direct management and real - time monitoring of the robot over the Internet allows a step innovation in engineering education in professional courses in robotics and automation through remote access to the training and experimental workplace. Students get a virtual visualization of process models and observed data. At the same time through web cameras and audio sensors, students get a real view of the experimental workplace by the real sound effects. The project aims to create a comprehensive education system in the field of robotics, integrating theoretical knowledge with practical experimentation in virtual reality environment as well as in real device robotic workstations, remotely controlled via the internet.
Title of the project	Creation of a comprehensive educational – teaching material for the article Production technique using a combination of traditional and modern information technology and e - learning
Type of the project	KEGA
Number of the project	023TUKE - 4/2012
Principal investigator	Peter Demeč, prof. Ing., CSc.
Time period of the project	2012 - 2014
Annotation of the project	The project is aimed at creating a research environment for the collection and processing of new knowledge of production engineering for engineering production and creation of a university textbook on the field. The project seeks to create existing and new knowledge for students and the general public, by professional and modern cogeneration. Part of the textbook will be multimedia attachments electronically focused to visualize the key issues in theory, as outlined in the individual chapters of the book. The project will be developed also instructions for exercises in the form of textbooks to undergraduate textbook and selected parts of the field will be processed for the internet version of education through e - learning. Project supports the main hub object in I.

respectively II. Degree of engineering study in study programs of courses Manufacturing Technology, Engineering Technologies and Materials, Mechanical Engineering, Automobile Manufacturing, Maintenance of Machinery Devices, Mechatronics and Industrial Engineering, which is not adequate textbooks and teaching equipment.

APPLIED RESEARCH TASKS

Title of the project	Research of modules for intelligent robotic systems
Type of the project	OPVaV
Number of the project	26220220141
Principal investigator	Mikuláš Hajduk, prof. Ing., PhD.
Time period of the project	2011 - 2014
Annotation of the project	The project is focused on the area of service robotics. The project is to create a new generation of modules for building robots, characterized by the integration of multisensory equipment with distributed intelligence, resulting in cognitive skills for generating the autonomous function of a human - robot cooperation. New modules will be offered on the market in a variety of attractive modifications, such as rescue work, security, pyrotechnic scouting, fight against terrorism, but also areas such as handling large pieces, assembly operations and operations requiring high performance and precision.
Title of the project	Comprehensive modular robotic system of middle category with higher intelligence
Type of the project	AV
Number of the project	Reg - 00169 - 0001
Principal investigator	Mikuláš Hajduk, prof. Ing., PhD.
Time period of the project	2010 - 2013
Annotation of the project	The project is focused on creating a comprehensive system of intelligent modules for building robotic systems intended for use in difficult conditions of rescue work during natural disasters, fires, protection against terrorism, decontamination of surfaces from toxic substances and the similar conditions.

VISITS OF STAFF MEMBERS TO FOREIGN INSTITUTIONS

Power machines and equipments

Employees and students	Country
Demeč Peter, prof. Ing., CSc.	Czech Republic
Džurný Michal, Ing.	Czech Republic
Hajduk Mikuláš, prof. Ing., PhD.	Czech Republic, Ukraine, Poland, Romania
Hudák Rastislav, Ing.	Czech Republic
Jendrejová Miroslava, Ing.	Czech Republic
Jánoš Rudolf, Ing., PhD.	Germany, Romania
Kuderjavy Peter, Ing.	Czech Republic
Semjon Ján, Ing., PhD.	Germany, Czech Republic, Romania
Sukop Marek, Ing., PhD.	Poland, Czech Republic, Romania
Vagaš Marek, Ing., PhD.	Germany
Varga Jozef, Ing.	Germany, Romania
Varchola Michal, Ing.	Ukraine

MEMBERSHIP IN SLOVAK PROFESSIONAL ORGANISATIONS

Cluster AT+R

Mikuláš Hajduk, prof. Ing., PhD.

SASI – Slovak Association of Mechanical Engineers

Peter Demeč, prof. Ing., CSc.

MEMBERSHIP IN INTERNATIONAL PROFESSIONAL ORGANISATIONS

Society for the machines of the Czech Republic (CZ)

Peter Demeč, prof. Ing., CSc.

PUBLICATIONS

Journals

- [1] HAJDUK, Mikuláš – JENČÍK, Peter – JEZNY, Jaromír – VARGOVČÍK, Ladislav: **Trends in Industrial Robotics Development** – 2013. In: Applied Mechanics and Materials, Vol. 282 (2013), ISSN 1660 - 9336
- [2] SMRČEK, Juraj – TULEJA, Peter: **Problem of Biomechanical Grippers Identifications Et's Propertie** – 2013. In: Applied Mechanics and Materials, Vol. 282 (2013), ISSN 1660 - 9336
- [3] JÁNOŠ, Rudolf – PÁCHNIKOVÁ, Lucia – TULEJA, Peter: **Design of Service Robot for Rescue Operations** – 2013. In: Applied Mechanics and Materials, Vol. 282 (2013), ISSN 1660 - 9336
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- [5] SUKOP, Marek: **Implementation of Two Cameras to Robotic Cell for Recognition of Components** – 2013. In: Applied Mechanics and Materials, Vol. 282 (2013), ISSN 1660 - 9336
- [6] SVETLÍK, Jozef – DEMEČ, Peter – SEMJON, Ján: **Rotational Kinetic Module with Unlimited Angle of Rotation** – 2013. In: Applied Mechanics and Materials, Vol. 282 (2013), ISSN 1660 - 9336
- [7] BELOVEŽČÍK, Andrej – BELOVEŽČIKOVA, Tatiana – PÁCHNIKOVÁ Lucia: **Optimization of Process Layout of Robotic Systems in the MSEVR System** – 2013. In: Applied Mechanics and Materials, Vol. 282 (2013), ISSN 1660 - 9336
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- [11] SEMJON, Ján: **The Procedure Designing Production Systems Based on CA Methods** – 2013. In: Applied Mechanics and Materials, Vol. 282 (2013), ISSN 1660 - 9336
- [12] BALÁŽ, Vladimír: **Flexible Production Cell with Information Systems** – 2013. In: Applied Mechanics and Materials, Vol. 282 (2013), ISSN 1660 - 9336
- [13] STEJSKAL, Tomáš – KOVÁČ, Juraj – VALENČÍK, Štefan: **Mechanism of Randomness in Vibration Signals of Machinery** – 2013. In: Applied Mechanics and Materials, Vol. 282 (2013), ISSN 1660 - 9336
- [14] HUDÁK, Rastislav: **Approaches to Dealing with More Parametric Diagnostics of Manufacturing Machines** – 2013. In: Applied Mechanics and Materials, Vol. 282 (2013), ISSN 1660 - 9336
- [15] KOVÁČ, Juraj – STEJSKAL, Tomáš – VALENČÍK, Štefan: **Virtual Reality in the Maintenance of Machinery and Equipment** – 2013. In: Applied Mechanics and Materials, Vol. 282 (2013), ISSN 1660 - 9336
- [16] BALOČKOVÁ, Lenka: **The Method for Solving Kinematics of an Industrial Robot** – 2013. In: Applied Mechanics and Materials, Vol. 282 (2013), ISSN 1660 - 9336
- [17] PEŠKOVÁ, Alena: **Modelling Maintenance and Renewal in Petri Nets** – 2013. In: Applied Mechanics and Materials, Vol. 282 (2013), ISSN 1660 - 9336
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- [20] DURKÁČ, Viktor - DŽURNÝ, Michal - MADÁČ, Kamil: **Metodický postup vŕtania veľkého počtu dier pomocou CAD systému CATIA V5 R19** - 2012. In: It - strojár. Roč. 3, č. 1 (2012), s. 1 - 2. - ISSN 1338 - 0761
- [21] DŽURNÝ, Michal: **Development and use integrated system of diagnosis and maintenance** - 2012. In: International Scientific Herald. Vol. 4, no. 23 (2012), p. 277 - 280. - ISSN 2218 - 5348
- [22] DŽURNÝ, Michal: **The integration of diagnostics with computer maintenance management system in corporations** - 2012. In: It - strojár. Č. 1 (2012), s. 1 - 3. - ISSN 1338 - 0761
- [23] DŽURNÝ, Michal - DURKÁČ, Viktor: **Analýza informačných systémov údržby a návrh prepojenia s diagnostikou** - 2012. In: It - strojár. Roč. 3, č. 1 (2012), s. 1 - 4. - ISSN 1338 - 0761
- [24] HAJDUK, Mikuláš - JÁNOŠ, Rudolf - SUKOP, Marek - TULEJA, Peter - VARGA, Jozef: **Trendy vývoja v priemyselnej robotike** - 2012. In: ATP Journal. Č. 5 (2012), s. 17 - 19. - ISSN 1335 - 2237
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- [27] JÁNOŠ, Rudolf: **Modulárne robotické systémy** - 2012. In: International Scientific Herald. Vol. 4, no. 23 (2012), p. 83 - 88. - ISSN 2218 - 5348
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- [29] JENDREJOVÁ, Miroslava: **Methodological aspects of raising the level of machine design** - 2012. In: International Scientific Herald. Vol. 4, no. 23 (2012), p. 116 - 120. - ISSN 2218 - 5348
- [30] JENDREJOVÁ, Miroslava - BOBOVSKÝ, Zdenko: **Štúdiá inovácie laboratória CAD** - 2012. In: International Scientific Herald. Vol. 4, no. 23 (2012), p. 238 - 244. - ISSN 2218 - 5348
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- [1] AUGUSTÍN, Michal - VARCHOLA, Michal: **Pattern Recognition For Intrusion Detection Systems** - 2012. - 1 elektronický optický disk (CD - ROM). In: ELITECH '12: 14th conference of doctoral students: Bratislava, May 22, 2012. - Bratislava: STU, 2012 S. 1 - 3. - ISBN 978 - 80 - 227 - 3705 - 0
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Department of Machine Design, Transport and Logistics



Contact

The head: Bigoš Peter,
prof. Ing., CSc.
E - mail: kkdal.sjf@tuke.sk
Address: Letná 9, 042 00 Košice, SR
Phone no.: +421 55 602 2507
Fax.: +421 55 602 2507



Staff

- Professors: 2
- Assoc. Professors: 5
- Assist. Professors: 9
- Researchers: 1
- PhD. Students: 6 internal, 2 external

Activities at the department

Date	Title of the event, activity characterizing the life at the department in 2012
2/2012	Lecture of a representative of Politechniki Śląskiej – Katowice - Poland (Ing. Grzegorz Wojnar, PhD.)
2/2012	Lecture of a representative of Politechniki Śląskiej – Katowice - Poland (Ing. Piotr Czech, PhD.)
11/2012	Lecture of a representative of Politechniki Śląskiej – Gliwice - Poland (Ing. Tadeusz Opasiak, PhD.)

EDUCATION AT THE DEPARTMENT

STUDY PROGRAMS

Bachelor's degree:

PhD. degree:

- **Transport Machines and Machinery**
- **Parts of Machines and Mechanisms**

Master's degree:

- **Transport Engineering and Logistics**
- **Machines and Machinery for Building Industry, Agriculture and Dressing**

Number of the students

(till 30. 10. 2012)

on the study programs guaranteed by the department:

first year of study:

- 20 internal form of study

second year of study:

- 26 internal form of study

Number of the graduates (2011/2012)

on the study programs guaranteed by the department:

- 40 students in the internal form of engineering study
- 16 students in the external form of engineering study
- 6 PhD. students in the internal form of study (defended PhD. thesis)
- 3 PhD. students in the external form of study (defended PhD. thesis)

GRADUATE PROFILE

MASTER'S PROGRAMS (Ing.)

Transport Engineering and Logistics

The study program "Transport Engineering and Logistics" in the branch of study "Transport Machines and Machinery" is a 2 - years engineer's study after the first 3 years of previous relevant Bc. - study. In the framework of this program there are presented basic information and knowledge from the area of theoretical principles, machine design (steel supporting structure and drives) and operation of transport and handling machines. There are described all important transport machines and machinery, which are working continuously (i.e. the large - scale spectrum of conveyors) and cyclically (i.e. lifting machines – the wide range of cranes and lifts), as well as fundamental principles of material flow projection and transport logistics applications.

Machines and Machinery for Building Industry, Agriculture and Dressing

The study program "Machines and Machinery for Building Industry, Agriculture and Dressing" in the branch of study "Transport Machines and Machinery" is a 2 - years engineer's study after the first 3 years of previous relevant Bc. - study. In the framework of this program there are presented basic information and knowledge from the area of theoretical principles, machine design (steel supporting structure and drives) and operation of mobile working machines (i.e. machines for building industry and agriculture) and dressing machines. From the area of building machines there are described earthmoving machines (e.g. wheel loaders, excavators dozers, graders, scrapers, dumpers), as well as other building machinery. Agricultural machines are represented by machines for plant production (e.g. harvesters, mowing machines) and machines for animal production. Crushers and mills are examples of dressing machinery.

PhD. PROGRAMS (PhD.)

Transport Machines and Machinery

The graduate obtains wide and deep theoretical knowledge in the field of transport and handling machines and machinery. He masters scientific methods of research and development in the area of transport machines and logistics. He can find a qualified job in research and development institutes in leading positions, as well as in technical universities. His professional skills are supported by ability to articulate autonomously and to solve research tasks, together with leading of a research team.

Parts of Machines and Mechanisms

The graduate obtains wide and deep theoretical knowledge in the field of parts of machines and mechanisms. He masters scientific methods of research and development in the area of machine design and machine parts. He can find a qualified job in research and development institutes in leading positions, as well as in technical universities. His professional skills are supported by ability to articulate autonomously and to solve research tasks, together with leading of a research team.

LIST OF SUBJECTS GUARANTEED BY THE DEPARTMENT

- ✓ CA - Methods of Structures Design
- ✓ Logistics of Production and Technical Systems
- ✓ Drives and Transmissions I.
- ✓ Experimental Methods
- ✓ Social - Science Subject
- ✓ Building Mechanics
- ✓ Theory and Design of Earthmoving Machines
- ✓ Applied Mathematics
- ✓ Progressive Production Technologies
- ✓ Safety of Technical Systems
- ✓ Reliability of Technical Systems
- ✓ Theory and Design of Conveyers
- ✓ Drives and Transmissions II.
- ✓ Semestral Project
- ✓ Steel Structures Design I.
- ✓ Storages and Storage Management
- ✓ Projection of Flexible Production Systems
- ✓ Computer Aided Design I.
- ✓ Technical Drawing
- ✓ Computer Aided Design I. and II.
- ✓ Machine Parts and Mechanisms II.
- ✓ Machine Parts and Mechanisms III.
- ✓ Numerical Methods in Mechanics
- ✓ Theory and Design of Lifting Machines
- ✓ Operational Strength
- ✓ Year - Class Project
- ✓ Theory of Vehicles
- ✓ Maintenance, Diagnostics and Repairs of Machines
- ✓ Steel Structures Design II.
- ✓ Computer Aided Design II.
- ✓ Logistics and Material Flows
- ✓ Public Transport Systems and Conveyances
- ✓ Diploma Project
- ✓ Diploma Work
- ✓ Elements of Mechanical Engineering
- ✓ Draw up of Technical Documentation
- ✓ Machine Parts
- ✓ Parts of Machines and Mechanisms
- ✓ Machine Parts and Mechanisms III.
- ✓ Computerized Graphics
- ✓ Material Flows and Logistics
- ✓ CAD – Systems
- ✓ Technical Documentation
- ✓ Transport Systems
- ✓ Elements of Design

GRADUATE THESES

MASTER'S THESES:

Transport Engineering and Logistics

Baran Peter	Stress analysis of supporting part for mobile crane
Barnišin Peter	The design of pneumatic flexible coupling for conveyor belt drive
Belej Peter	Design of building tower crane
ČačíkTomáš	Telescopic belt conveyor
Čirip Martin	The innovation performance engine parts using computer simulation of flow
Danko Ján	Transport of dust outlets from filters.
Fedorik Lukáš	Design of vacuum chamber in the process of gearbox Production
Gaľa Michal	Design of detachable roof mechanism for railway wagon

Gibel' Daniel	Construction of manipulation jig for production of weldments
Jahňak Ľuboš	Design of manipulation jig for production of long weldment
Kaduk Radoslav	Continual Vertical Conveyor
Kimpánová Jana	Design of material flow in retail shop
Klein Lukáš	Device for manipulation with clips
Korol Daniel	Electric two - beam bridge crane with lifting capacity 2x12 500 kg x 11m
Korunová Mária	Computational analysis of the driving station and modification of the belt conveyor components
Koščo Tomáš	Electric two - beam bridge crane with lifting capacity 2x6 000 kg x 20m
Krestian Daniel	Optimisation of material flows in firma gebruederweiss
Lazor František	Application of the knowledge - fusion method for interactive design of One - girder bridge crane
Mati Tomáš	Combined tram - train passenger transport in the region of the city Košice
Pamuk Jozef	Project of mechanical device for shifting of railway wagons into wagon dump
Petrik Jozef	Cleaning mechanism of beard remover of slab bloom
Prokopovič Patrik	Transport of dust outlets from filters.
Pušár Patrik	The design of testing station for pallets from industrial washing - machine
Rothmajer František	Horizontal adjustable table
Rudy Štefan	Innovation of belt conveyor driving station focused on gearbox modification
Sakáč Tibor	The design of resonance separator for classified loose materials
Šima Martin	Design modification of gear coupling
Sokolský František	Evaluation of compressor reliability in serial production
Stark Ján	Suspension platform for inspection of internal areas of metallic silos
Tropp Peter	Design of cable drum with placement for divide station cableway

PhD. THESES:**Transport Machines and Machinery**

Cenký Jozef	Logistic as a tool of reducing the risk in material handling in intermodal transport
Kux Roman	Improving the performance characteristics of propulsive units wheelers
Möller Jan	Viability of knowledge management prior to the background of medium - sized businesses succession based on logistic industry examples

Schneider Marek	The correction of surfaces utilizing Bézier curves translated by scanned cloud of points
Siman Marián	Simulation of fluid flow in the drive units of vehicles

Parts of Machines and Mechanisms

Čopan Pavol	Application of new tuning method of torsionally oscillating mechanical systems
Urbanský Matej	Research of mechanical system response to gaseous medium pressure change in pneumatic coupling
Vrábel Peter	Introduction to the problem of dangerous vibration and noise of mechanical drive units

RESEARCH AT THE DEPARTMENT

Area of research:

Transport Engineering and Logistics

- ✓ Optimisation of material flows
- ✓ Identification and simulation of logistic relations in production control and supplying
- ✓ New concepts of more perfect handling machines and machinery with high - level reliability characteristics
- ✓ Experimental verification of dynamic properties of steel supporting structures of transport machines from the point of view of their reliability and residual durability

Section of Machine Design and Machine Parts

- ✓ Tuning - up of torsion vibrating mechanical systems by pneumatic tuners with regard to dangerous torsion vibration
- ✓ Diagnostics of various types of mechanical systems and equipment from the point of view of torsion vibration and excited mechanical oscillations supplying
- ✓ Research, development and design of new types of elastic shaft couplings
- ✓ Optimisation of mechanical systems from the point of view dangerous torsion vibration

Research characteristics:

Up to the year 1990 there were solved at our Department various research tasks from the area of machine design and operation of the transport, building and agricultural machinery, with regard to analysis of dynamic characteristics and operational reliability, above all. The most important institutions cooperating with our Department were: Institute for Mechanics of Slovak Academy of Science, Institute for Research and Development of Engineering in Martin, Institute for Research and Development of Engineering in Zvolen, East - Slovak Metalworks in Kosice.

The important success of the Department was obtained at the International Engineering Fair in Brno in 1975 as a result of cooperation with the Institute for

Research and Development of Engineering in Zvolen, as well as the "Gold Medal Award" in 1976 repeatedly, in cooperation with the crane - building factory in Brezno. After 1990 there are two most important areas of our research activities: durability and reliability of steel supporting structures of lifting machines; logistics and material flows.

The above - mentioned research areas are diversified into the following important topics: optimisation of material flows, identification and simulation of logistic relations in production control and supplying, new concepts of more perfect handling machines and machinery with high - level reliability characteristics, experimental verification of dynamic properties of steel supporting structures of transport machines from the point of view of their reliability and residual durability.

Cooperation with practice is focused on following topics: experimental measurement of operational loads of steel supporting structures of transport and handling machines and machinery, prediction of durability, project and realization of heavy load transportation, structural design of new components of manipulation equipment, suggestion and solution of inter - operational transport, logistic project of a Shopping - Functional Centre.

The most important cooperating partners are: US - Steel Košice, Cargo Bratislava, Transport Research Institute Žilina, Whirlpool Poprad, Wagon - works Poprad.

Areas of expertises:

Section of Transport Machines and Logistics

- ✓ Optimisation of material flows
- ✓ Identification and simulation of logistic relations of production control and supplying
- ✓ New concepts of more perfect handling machines and machinery with high - level reliability characteristics
- ✓ Experimental verification of dynamic properties of steel supporting structures of transport machines from the point of view of their reliability and residual durability

Section of Machine Design and Machine Parts

- ✓ Research, development and design of new types of elastic shaft couplings
- ✓ Optimisation of mechanical systems taking into consideration dangerous torsion vibrations
- ✓ Tuning - up of torsion vibrating mechanical systems by means of pneumatic tuners with emphasize on dangerous torsion vibration
- ✓ Diagnostics of various types of mechanical systems and equipment with regard to torsion vibration and excited mechanical oscillation

PROJECTS OF THE DEPARTMENT

NATIONAL PROJECTS

Title of the project	Innovative processes in construction of driving units applied in transport means, machines and optimisation of material flows and logistics in order to save energy and to increase reliability with regard to application purposes in the practice
Type of the project	Grant project VEGA
Number of the project	1/10356/11
Principal investigator	prof. Ing. Peter Bigoš, CSc.
Time period of the project	01/2010 - 12/2013
Annotation of the project	This scientific project is oriented in two main areas: the first one is innovation of constructional elements of driving unit, which is applied in transport vehicle in order to reach the maximum possible power output and torque, whilst keeping the constant stroke volume; to increase its reliability and to reduce emissions significantly. The second one is projection of logistic systems in material flows generally, as well as application of them in the production, in the transport and in the services. Within the framework of the both above - mentioned cases there will be solved innovative tasks in order to achieve the required technical parameters, to optimise the whole system, to save energy and to increase reliability taking into consideration possible application purposes in the practice.
Title of the project	Research and application of universal regulation system in order to master the Source of mechanical systems excitation
Type of the project	Grant project VEGA
Number of the project	1/0688/12
Principal investigator	prof. Ing. Jaroslav Homišin, CSc.
Time period of the project	01/2010 - 12/2015
Annotation of the project	In general terms the mechanical systems (MS) means the system of driving and driven machines arranged to perform the required work. We divide them into MS operating with constant speed and MS working with a range of speed. In terms of dynamics we understand MS as a system of masses connected with flexible links, it means systems that are able to

oscillate. Especially piston machines bring heavy torsional excitation into the system, which causes oscillation, vibration, and hence their noise. Governing of the torsional vibration, as a source of MS excitation, on a basis of results of our research, can be achieved by applying a pneumatic coupling tuned by the proposed universal control system. On this basis, it can be concluded that with given connection a new continuous tuning method in steady state a connection of MS is created.

Therefore, the aim of project will be the research, application and analysis of the function of universal control system for governing the MS excitation source with proposed method.

VISITS OF STAFF MEMBERS TO FOREIGN INSTITUCIONS

Transport Engineering and Logistics

Employees and students

Siman Marián, Ing.

Schneider Marek, Ing.

Country

Germany (02. 11. 2012 - 30. 11. 2012)

Czech Republic (15. 03. 2012 - 20. 04. 2012)

Machine Design and Machine Parts

Employees and students

Homišín Jaroslav, prof. Ing., CSc.

Urbanský Matej, Ing.

Čopan Pavol, Ing.

Country

Poland (18. 6. 2012 - 22. 6. 2012)

Poland (18. 6. 2012 - 22. 6. 2012)

Czech Republic (1. 10. 2012 - 31. 10. 2012)

Czech Republic (1. 10. 2012 - 31. 10. 2012)

Vrábel Peter, Ing.

PUBLICATIONS

Books

- [1] BIGOŠ, Peter - KULKA, Jozef - KOPAS, Melichar - MANTIČ, Martin: **Teória a stavba zdvíhacích a dopravných zariadení** / - Košice: TU, SJF - 2012. - 356 s.. - ISBN 978 - 80 - 553 - 1187 - 6.

Journals

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- [2] PUŠKÁR, Michal - BIGOŠ, Peter - PUŠKÁROVÁ, Paula: **Accurate measurements of output characteristics and detonations of motorbike high - speed racing engine and their optimization at actual atmospheric conditions and combusted mixture composition** / - 2012. In: Measurement. Vol. 45, no. 5 (2012), p. 1067 – 1076. - ISSN 0263 - 2241

- [3] BIGOŠ, Peter - PUŠKÁR, Michal - PEŠEK, Ladislav: **Assessment of the critical places in the casted piston based on a local strength – microstructure model** / - 2012. In: Chemické Listy. Vol. 106, no. S3 (2012), p. s379 - s382. - ISSN 0009 - 2770

- [4] BIGOŠ, Peter - KULKA, Jozef - MANTIČ, Martin - ČURILLA, Jaroslav: **Continual measuring of local stress values on shell of the blast furnace hearth and of total shell expansion** / - 2012. In: Metalurgija. Vol. 51, no. 1 (2012), p. 55 - 58. - ISSN 0543 - 5846
- [5] BIGOŠ, Peter - PUŠKÁR, Michal - KOPAS, Melichar: **Design of Mechatronic System Specified for Feedback Required in Development of Combustion Engines** / - 2012. In: Procedia Engineering. Vol. 48 (2012), p. 30 - 34. - ISSN 1877 - 7058
- [6] KOPAS, Melichar - FALTINOVÁ, Eva: **Innovative - optimisation approach to design of constructive component in bulk solid storage bin** / - 2012. In: Zeszyty naukowe Politechniki Śląskiej: seria: Transport. Vol. 76, no. 1865 (2012), p. 87 - 92. - ISSN 0209 - 3324
- [7] KAŠŠAY, Peter - HOMIŠIN, Jaroslav - URBANSKÝ, Matej: **Formulation of Mathematical and Physical Model of Pneumatic Flexible Shaft Couplings** / - 2012. In: Zeszyty naukowe Politechniki Śląskiej: seria: Transport. Vol. 76, no. 1864 (2012), p. 25 - 30. - ISSN 0209 - 3324
- [8] HOMIŠIN, Jaroslav - URBANSKÝ, Matej - KAŠŠAY, Peter: **Investigation of various factors influence on dynamic load of mechanical system by pneumatic coupling application** / - 2012. In: Zeszyty Naukowe Politechniki Śląskiej. Vol. 76, no. 1864 (2012), p. 13 - 18. - ISSN 0209 - 3324
- [9] BIGOŠ, Peter - KULKA, Jozef - MANTIČ, Martin - FALTINOVÁ, Eva - ČURILLA, Jaroslav: **Experimental Analysis of Strain of Blast Furnaces Shell During the Start up to** / - 2012. In: Procedia Engineering. Vol. 48 (2012), p. 24 - 29. - ISSN 1877 - 7058
- [10] VOJTKOVÁ, Jarmila - MEDVECKÁ - BEŇOVÁ, Silvia: **Normal forces on a stator in a planetary toroidal roller drive** / - 2012. In: Zeszyty Naukowe Politechniki Śląskiej. Vol. 1864, no. 76 (2012), p. 43 - 48. - ISSN 0209 - 3324
- [11] KRAJŇÁK, Jozef - GREGA, Robert: **Comparison Of Various Gases And Their Influence On Dynamic Properties Of Flexible Pneumatic Coupling** / - 2012. In: Zeszyty Naukowe Politechniki Śląskiej. Vol. 76, no. 1865 (2012), p. 31 - 36. - ISSN 0209 - 3324
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- [16] TONHAJZER, Roman - PUŠKÁR, Michal: **Structure data field of control unit in racing motorcycle** / - 2012. In: Zdvihací zařízení v teorii a praxi. Vol. 7, no. 1(2012), p. 69 - 72. - ISSN 1802 - 2812
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- [26] SIMAN, Marián - KUX, Roman - PUŠKÁR, Michal: **Možnosti využitia simulačného softwaru pri zvyšovaní výkonových parametrov spaľovacieho motora** / - 2012. In: Spravodaj ATD SR. Č. 2 (2012), s. 15 - 16. - ISSN 1337 - 8252
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INSTITUTE OF SAFETY, QUALITY AND ENVIRONMENTAL SCIENCE

- Department of Safety and Quality of Production
- Department of Environmentalistics
- Department of Power Engineering





Department of Safety and Quality of Production



Contact

The head: Sinay Juraj,
Dr.h.c. mult. prof. Ing., DrSc.
E - mail: juraj.sinay@tuke.sk
Address: Letná 9, 042 00 Košice, SR
Phone no.: +421 55 602 2501



Staff

- Professors: 3
- Assoc. Professors: 1
- Assist. Professors: 6
- Researchers: 1
- PhD. Students: 4 internal, 7 external

Activities at the department

Date **Title of the event, activity characterizing the life at the department in 2012**

2/2012 National Forum on Maintenance 2012
 10/2012 Conference: MachineDiagnostics DIS
 11/2012 Conference: Current Issues of Occupational Safety and Health

EDUCATION AT THE DEPARTMENT

STUDY PROGRAMS

Bachelor's degree:

- Occupational Safety and Health
- Quality of Production

PhD. degree:

- Safety of Technical Systems

Master's degree:

- Safety of Technical Systems
- Production Quality Engineering

Number of the students (until 30. 10. 2012)

on the study programs guaranteed by the department:

first year of study:

- 37 internal form of study
- 33 external form of study

second year of study:

- 35 internal form of study
- 54 external form of study

Number of the graduates (2011/2012)

on the study programs guaranteed by the department:

- 26 students in the internal form of engineering study
- 15 students in the external form of engineering study
- 2 PhD. students in the internal form of study (defended PhD. thesis)
- 2 PhD. students in the external form of study (defended PhD. thesis)

GRADUATE PROFILE

BACHELOR'S PROGRAMS (Bc.)

Occupational Safety and Health

The study programme prepares students for the profession of safety technicians in enterprises. Graduates are able to analyse and solve issues of prevention, identify hazards and evaluate risks at work in various industries and sectors. Students of this programme obtain an overview of European and national OSH legislation and its application in practice. The study programme also focuses on design and implementation of safety management systems and their integration with other systems, (e.g. quality and environmental management systems), as well as their incorporation in other comprehensive systems – e.g. prevention of major industrial accidents, fire protection. Graduates of this study programme can find employment as safety managers or OSH coordinators.

Quality of Production

The study programme provides an overview of production procedures of industrial technologies, process solutions, basic metrological skills, auditing and certification procedures, methodology of statistic regulation of production processes, and the utilization of information technology. The graduates are able to design and implement quality management systems and manage or supervise complex processes and productions.

MASTER'S PROGRAMS (Ing.)

Safety of Technical Systems

The programme covers a wide area of the assessment of technical safety of machines and devices. The most important part of study programme is the analysis of technical risk by employing modern identification methods that integrate several scientific disciplines. High standard of technical safety is the primary requirement in the construction of modern machines and systems. The graduates of this programme have the potential to succeed as safety managers, design engineers, OSH coordinators and safety engineers.

Production Quality Engineering

The study programme provides instruction related to production procedures of industrial technologies, process solutions, metrological skills, auditing and certification procedures, methodology of statistic regulation of production processes and the utilization of information technology. The graduates are able to design and implement quality management systems and manage or supervise complex processes and productions. They can find employment as senior quality managers, as they possess the knowledge and skills that enable them to manage production processes in industrial enterprises, efficiently use information technology and process complex data.

DOCTORAL PROGRAMMES (PhD.)

Safety of Technical Systems

PhD. graduates have a good command of scientific methods and approaches to OSH, testing and evaluating various factors that influence the level of safety, defining

and managing the safety culture and determining individual indicators for its application and evaluation. They have the potential to succeed as senior managers in the field of OSH management system and integrated systems, academic or research staff, and experts on OSH, fire protection and major industrial accidents prevention.

LIST OF SUBJECTS GUARANTEED BY THE DEPARTMENT

Power machines and equipments

- ✓ Fundamentals of H&S
- ✓ Legislative of H&S
- ✓ Semester Project
- ✓ Safety Protection at Workplace
- ✓ Risk Management
- ✓ Explosion and Fire Protection
- ✓ Quality of Production
- ✓ CAD – Modeling Simulation
- ✓ CA – Techniques for Risk Analysis
- ✓ Technical Diagnostics I.
- ✓ Maintenance Management I.
- ✓ Selected Chapters of H&S
- ✓ Final Project
- ✓ Final Work
- ✓ Quality Management Systems
- ✓ Crises Management
- ✓ Dangerous Substances and Personal Protection
- ✓ Quality Production Engineering I.
- ✓ CA - Methods of Construction Design I.
- ✓ Total Quality Management
- ✓ Maintenance Management II.
- ✓ Selected Chapters from Experimental Methods and Examine of Machines and Equipments
- ✓ Theoretical Basics of Selected Technical Diagnostics Methods
- ✓ QMS Documentation
- ✓ Selected Chapters from Quality Management System
- ✓ Occupational Safety in Production
- ✓ CA - Methods of Construction Design I.
- ✓ CA - Methods of Construction Design II.
- ✓ CA - Methods of Construction Design III.
- ✓ Diploma Work
- ✓ Diploma Project
- ✓ Integrated Management Systems
- ✓ Design of Safety Systems
- ✓ Legislation and Safety for Machine Design, Production and Operation
- ✓ Major Hazards Accidents
- ✓ Technical Diagnostics II.
- ✓ Development Trends in Branch
- ✓ Technical Tools of Fire Prevention
- ✓ Crises Management II.
- ✓ Selected Chapters of Quality Management System
- ✓ Quality Production Engineering II.
- ✓ Generic Management
- ✓ Accreditation, Certification, Audit
- ✓ Risk Predetermination and Risk Assessment
- ✓ Complex of Integrated Operating Management - Quality, Safety, Environment

GRADUATE THESES

BACHELOR'S THESES:

Occupational Safety and Health

Bakaľarová Zuzana	Occupational health and safety in laboratories
Benedik Peter	Identification of hazards and treats by biomass gasification
Cmar Jakub	Maintenance tool in enhancing the reliability of machinery - tractors
Čekanová Eva	Workplace safety and health risks of ionizing radiation
Freňáková Viktória	The impact of climate on health and safety at work
Hanák Jozef	Analysis of accidents by graphic imaging methods
Ištočy Slavomír	Analysis of firefighters in selected situations
Kollárová Júlia	Measures to reduce risks at work on the building site
Köver Milan	Risk analysis in the handling cost in the specific conditions
Kuta Viktor	Barrier models and their use in nuclear power engineering
Laurová Ivana	Risks as part of the restoration of cultural monuments
Malčický Roman	FMEA analysis of selected machinery
Miková Monika	Safety working at heights and over free depth
Morová Veronika	The system of risk management in aviation
Mycio Viliam	Safety and risks associated with working with chemicals
Ňachajová Ľudmila	The interaction of safety and security in the postal system
Niskačová Katarína	Evaluation of selected groups of chemicals in the process of risk management in interaction of safety and security
Ondirová Veronika	Terrorism as potential for technological disasters
Pekarčíková Silvia	Threats and risk assessment in welding
Popovičová Mária	Methods for evaluation of mental workload in terms of level of working conditions of work with display
Prasol Tomáš	Comprehensive method for assessing the risk of mechanical danger machinery - telescopic loader
Rakačová Martina	Risk management on selected work positions
Ridilová Miroslava	Comparison of risk management systems within the safety and security in selected countries
Sčensná Dominika	Measurement of noise immission as factors affecting safety
Stanko Juraj	Safety measures implemented in release of nuclear material
Sulyok Patrik	Determination of common and different features of risk management processes in the field of chemical technology platform in the safety and security
Szabó Bartko Gabriel	Hazard and threats in a work on selected machines
Szabóová Veronika	Rules of safety and health at work in thermal power
Škvarlová Dana	Measures to improve safety in the select company

Vasilová Mária	Measures to reduce noise at work – manufacturing facilities
Vasiľová Gabriela	Risk analysis in agriculture - repair shops
Ziolkovský Tomáš	The effect of safety programs on life - threatening risks

Quality of Production

Běhunčík Miroslav	Analysis of factors affecting the performance of the organization
Bérešová Gabriela	Control Charts as a tool for quality management
Farkaš Jakub	The application of selected instruments to improve the manufacturing process
Hans Viktor	Corporate culture as part of process improvement through people
Hans Viliam	Perceptions of the organization by managing customer complaints
Haviarová Nicol	Customer Relationship Management
Chytilová Simona	Monitoring employee satisfaction as one of the requirements of QMS
Illésová Beáta	Financial and non - financial forms of motivation as a tool for increasing productivity
Lešaničová Ivana	The contribution of visual management in terms of production organizations
Lešková Ivana	The analysis capabilities of the manufacturing process
Mochnaľová Jana	Economic aspects of quality assurance products
Olejník Peter	Analysis of logistics activities in relation to ensuring of quality product
Palko Martin	Integrated management system auditing
Paricsiová Timea	The role of management resources within the Quality Management System
Pet'ková Adriana	The use of selected instruments of quality management in practice
Tomašovová Ivana	Ergonomics as a tool for improving the work process in the selected
Tóthová Zuzana	Customer satisfaction as a path to permanent prosperity organizations
ahurancová Lucia	Teamwork and internal communication - a way to improve processes
Béreš Štefan	Optimization of personnel activities in the selected organization
Bodnárová Katarína	The application of quality management principles in practice
Bozogáň Lukáš	The quality of the organization and its products in marketing communications - opportunities and barriers to implementation
Dudáš Michal	National quality policy
Hric Emil	The importance of benchmarking in improving product quality
Jašeková Anita	Comparison and analysis of models and standards of management systems for their integration
Kóvérová Mária	The proposal and the monitoring of employee motivation and satisfaction

Körtvély Oto	Quality management system of the production process in the selected organization
Mach Jakub	The importance of metrology in quality assurance in production
Miklušová Katarína	Quality at harvest and removal of municipal waste in selected municipalities
Olexová Mária	Analysis critical points in implementing and maintaining quality management system
Pekarčík Peter	Documentation to ensure an integrated management system
Rusnáková Mária	Quality and efficiency of wastewater treatment plant
Zaťko Peter	Quality and prosperity of the organization through human resources

MASTER'S THESES:**Safety of Technical Systems**

Bardáková Lucia	Organizational measures as a tool for risk reduction in industry company
Deáková Zuzana	Legislation requirements catalogue for OHS in SMEs
Dlugošová Dominika	Audits methodology of maintenance management system
Fidler Ľubomír	Quantification stages causal dependence of the breakdown
Forrai Filip	Utilization of barriers models in technological accidents area
Halászová Slávka	Application of safety measures in chosen food company
Jaššová Veronika	Methodology of risk assessment in photovoltaic equipments with view to whole life circle
Juštík Lukáš	Utilization of barriers models in OHS area
Kababik Tibor	Changing the production process on the dynamolink to optimize maintenance requirements
Kerekešová Anita	Verification of the model to evaluate the effectiveness of maintenance
Kocúrová Klaudia	Safety elements in the railway tunnel system
Krempaská Slávka	Release of dangerous goods at the railway station and assessment of consequences
Germanová Katarína	Software tools of statistical quality control in the selected organization
Kuruc Radovan	Analysis of protective control systems in intelligent motor - car
Lacková Alica	Analysis of road accidents and measures proposal with respect to gas installations
Ludrovský Michal	Risk analysis new developing materials and their properties
Lukáčová Mária	Safety measures in biomass energy treatment process
Marfiak Lukáš	Optimization of production processes in selected company as a tool for risk reduction

Nagyová Monika	Modernization of technological equipment for dematerialized water production in order to optimize production and increase safety in TEKO company
Nedoroščík Jaroslav	Reconstruction of Steam boiler PK - 4 in order to optimize production and increase the safety of technological equipment in TEKO company
Olexová Jana	Application of performance measurement in maintenance management
Ondíková Veronika	Safety measures at selected technological equipment
Papcunová Martina	Improving the effectiveness of maintenance by selected method
Sekelský Jozef	Safety measures in geothermal energy treatment process
Schneiderová Alexandra	Application possibilities and potential threats during utilization of container systems in the fire brigade and rescuers
Slivková Anežka	Program of maintenance management with systems management requirements application
Srvátková Magdaléna	Risks of selected processes in the enterprise
Suchá Anna	Safety measures in chosen company
Szuperáková Štefánia	Safety in the case of machines used for harvesting of grain and corn – cutter bar tables
Vrabliková Jana	Optimization of risk management methods applied in large, medium and small enterprises in relation to the aging workforce
Vrtílková Renáta	Risk management in selected SMEs
Zátorská Dana	Risk assessment according conformity requirements for „old“ machinery

Production Quality Engineering

PhD. THESES:

Safety of Technical Systems

Beňadiková Anna	Model for management of safety criteria parameters in IT
Erdélyi Štefan	Maintenance management of technical facilities for alternative sources of energy
Gecelovská Daniela	Interaction of risks in maintenance with presence of threats
Hrivík Rudolf	Proposal of optimal form of pro - active maintenance in order to perform effective operational control in nuclear power plants
Hudák Ľuboš	Methodology of machine safety evaluations during whole life cycle of them
Kalafut František	Development of criteria for the integration of management practices for risk management at the interface of safety and security

Kardošová Alica	Synergic procedures between ergonomic analysis and risk management systems in the new technologies
Kováčová Barbora	Methods for identification of synergetic effects for renewable sources of energy
Potočný Vladimír	Analysis of present methods in maintenance management using IT
Puškáš Ján	Proposal of optimal methods of predictive maintenance in order to monitoring status of machineries in power - supply plants
Seman Marek	Optimisation of maintenance management with regard to risks of working environment in selected sector
Šviderová Katarína	The philosophy of risk assessment changes associated with increasing active age of employees
Vargová Slavomíra	The interaction of security and safety in risk management

RESEARCH AT THE DEPARTMENT

Area of research:

- ✓ Research into methods and approaches to management of new and emerging risks related to new technology and renewable energy sources.
- ✓ Analysis of technical, environmental and human risks, aiming for sustainable development of mechanical engineering production and products.
- ✓ Risk management processes related to machines and technological systems in the safety & security interface.
- ✓ Research into risks related to industrial technologies within the integrated safety as a precondition for sustainable development.
- ✓ Effective maintenance management methods utilizing KPI (Key performance indicators).
- ✓ Ergonomic analyses as risk prevention measures.
- ✓ Application of quality management related to industrial technologies and final products.
- ✓ Objectification of quality parameters in the field of research and education.

Innovation procedures:

- ✓ Design of vehicles with minimum fuel consumption, in connection with the Shell - Eco Marathon competition.
- ✓ Design of hydrogen - powered vehicles.
- ✓ Audit structure and effective certification procedures for companies and organizations.
- ✓ Leadership in the national policy on the quality of tertiary education in the Slovak Republic and also within the EU Structural Funds.
- ✓ Implementation of a project whose objective is to establish a certification and consulting centre for technical, environmental and human risks; a partial task included in the project of establishing a University Scientific Park at the Technical University of Košice.

Scientific analyses:

- ✓ Risks related to manufacturing technologies – analyses and development of effective prevention methods.
- ✓ Safety & security interface as a part of integrated safety – extended causal dependence.
- ✓ Safety of critical infrastructure.
- ✓ Major industrial accidents – effective risk minimization.
- ✓ Development of technical diagnostic methods for an integrated approach to preventing machine and system failures related to the development and implementation of new techniques and technology.
- ✓ Determination of quality parameters for new products in accordance with the legislation and customer requirements.

Department of Safety and Quality of Production offers drawing up fallback procedures for industries in accordance with Act of the National Council of the Slovak Republic No 261/2002, Coll. on the Prevention of Major Industrial Accidents:

- ✓ Categorization of the enterprise and preliminary risk assessment.
- ✓ Notification of the categorization findings.
- ✓ Risk evaluation (in collaboration with BESTOFT company).
- ✓ Major industrial accidents prevention programme.
- ✓ Safety management system.
- ✓ Fallback procedures, including scenarios and complete building floor plans.
- ✓ Safety reports.

Scientific analyses:

Co - organizing National Maintenance Forum conferences in Slovakia and DIAGO conferences in the Czech Republic

PROJECTS OF THE DEPARTMENT

Title of the project	Research Centre for the management of technical, environmental and human risks, aiming for continuous development of production and products in mechanical engineering
Number of the project	ITMS26220120060
Principal Investigator	Dr.h.c. mult. prof. Ing. Juraj Sinay, DrSc.
Years of implementation:	2010 – 2013
Annotation of the project:	Establishing a sustainable centre conducting research in the management of technical, environmental and human risks, with the aim of achieving continuous progress in mechanical engineering production and products.

Title of the project **Research centre for efficient integration of renewable energy sources - VUKONZE**

Number of the project ITMS26220120064

Principal Investigator Dr.h.c. mult. prof. Ing. Juraj Sinay, DrSc.

Years of implementation: 2010 – 2012

Annotation of the project: The aim of the project is creating the VUKONZE Centre (research into the efficiency of integrated systems of renewable energy sources).

Title of the project **New technologies for energy - efficient, cost - effective and environmentally friendly utilization of biomass**

Number of the project ITMS26220120063

Principal Investigator prof. Ing. Hana Pačaiová, PhD.

Years of implementation: 2010 - 2012

Annotation of the project: The purpose is to develop a risk assessment model for a new technical solution of biomass utilization. This model takes into account the existing and emerging risks and allows for the implementation of quality management processes based on the evaluation of life - cycle costs of the proposed solutions.

Title of the project **The development of joint research, development and innovation centre and its utilization in increasing the efficiency of the thermal treatment of raw materials**

Number of the project ITMS26220220151

Principal Investigator prof. Ing. Hana Pačaiová, PhD.

Years of implementation: 2011 - 2012

Annotation of the project: The aim of this activity is to create a joint research centre that focuses on the development of high - tech technologies and thus facilitates sustainable competitiveness in the treatment of domestic non - metallic raw materials.

NATIONAL PROJECTS

Title of the project **Research into new and newly emerging risks related to industrial technologies within integrated safety as a precondition for the management of sustainable development**

Number of the project APVV - 0337 - 11

Principal Investigator Dr.h.c. mult. prof. Ing. Juraj Sinay, DrSc.

Years of implementation: 2012 - 2015

Annotation of the project Model based on integrated risk analysis will be developed to support the management of sustainable development of industrial technologies of mechanical engineering products. The model will

focus on risks related to new technologies and products in particular phases of their life cycle. Its aim will be to define particular phases of causal dependence in the occurrence of negative phenomena. Methods of qualification and quantification will be developed, aiming at risk minimization.

Title of the project	Research into the process of management of risks related to machines and technical systems in the safety & security interface – safety of technical systems, occupational safety and civil security
Number of the project	1/0107/12
Principal Investigator	Dr.h.c. mult. prof. Ing. Juraj Sinay, DrSc.
Years of implementation:	2012 - 2015
Annotation of the project:	Effective risk management process covering the safety of machines and technical systems as well as civil security is one of current priorities in enterprises. It is substantially dependent on the relevance of risk identification and quantification. Due to the overlap between safety and security risk management, there is a need to develop methods of the application of technical solutions which take human factors into consideration. The risk minimization precautions utilize modern ICT, maintenance technologies, and methods of technical diagnostics. KPI parameters are designed to assess the effectiveness of the proposed measures.

INTERNATIONAL PROJECTS

Title of the project	iNTeg - Risk – Early recognition, monitoring, and integrated management of emerging, new technology related risks
Number of the project	CP 213345 - 2
Principal Investigator	prof. Ing. Hana Pačaiová, PhD.
Years of implementation:	2008 - 2013
Annotation of the project	iNTeg - Risk is a large - scale integrating project aimed at improving the management of emerging risks related to new technologies in European industries. This will be achieved by designing a new management paradigm for emerging risks as a set of principles supported by a common language, agreed tools & methods, and Key Performance Indicators, all integrated into a single framework. The project aim is to reduce time - to - market for the

lead market EU technologies and promote safety, security, environmental friendliness and social responsibility as a trademark of EU technologies.

VISITS OF STAFF MEMBERS TO FOREIGN INSTITUTIONS

Sinay Juraj, Dr.h.c. mult. prof. Ing., DrSc.	Czech Republic, Germany
Pačaiová Hana, prof. Ing., PhD.	Czech Republic
Oravec Milan, prof. Ing., PhD.	Czech Republic, Germany
Kamenický Lukáš	Portugal
Vargová Slavomíra	Germany
Namešanská Jana	Czech Republic

MEMBERSHIP IN SLOVAK PROFESSIONAL ORGANISATIONS

Juraj Sinay, Dr.h.c. mult. prof. Ing., DrSc.	TU Ostrava, the Scientific Council of the University of Trenčín in Trenčín A. Dubčeka and Scientific Council of the Faculty of Mechanical Engineering, TU.
✓ Member of SOK/ Joint Trade Union Committee for the defence of doctoral dissertations in the field of transport and handling equipment and Chairman of SOK in the field of technical safety systems and safety.	
✓ Chairman of the Joint Commission for the PhD. defence in the fields of transport and handling equipment, machinery and safety of technical systems.	
✓ Chairman of the Scientific Council of TU Košice, Scientific Council of Zvolen, the Scientific Board of VSB	
	Hana Pačaiová, prof. Ing., PhD.
	✓ Member of accreditation group for education (No. 124/2006 Coll.).
	✓ Member of Supervisory Board of Slovak Maintenance Society.
	✓ Member of Association of Technical Diagnostics SR.
	Milan Oravec, prof. Ing., PhD.
	✓ Member of Editorial Board Safety of Work, ASPOS

MEMBERSHIP IN INTERNATIONAL PROFESSIONAL ORGANISATIONS

Juraj Sinay, Dr.h.c. mult. prof. Ing., DrSc.	professor of traffic engineering in Europe, based in Berlin - FRG.
✓ Member of the Working Group IVSS, Sektion Maschinenschutz based in Mannheim, FRG.	✓ Member of the editorial board of safe work Editorial Board member of the Human Factors and Ergonomics in Manufacturing, ISSN1520 - 6564, Wiley New York/ USA.
✓ Member of the Gesellschaft für Sicherheitswissenschaften /security company for technology/ VDI Wuppertal, FRG. Member of the Conference of the German - speaking	
	Hana Pačaiová, prof. Ing., PhD.
	✓ Member of the organizational Board of the conference AHFE.

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Department of Environmentalistics



Contact

The head: Badida Miroslav,
Dr.h.c. prof. Ing., PhD.
E - mail: miroslav.badida@tuke.sk
Address: Letná 9, 042 00 Košice, SR
Phone no.: +421 55 602 2716
Fax.: +421 55 602 2716



Staff

- Professors: 5
- Assoc. Professors: 3
- Assist. Professors: 6
- Researchers: 5
- PhD. Students: 5 internal, 8 external

Activities at the department

Date	Title of the event, activity characterizing the life at the department in 2012
2/2012	Lecture of noise visualization from D2R (Ing. Richard Drahoš)

EDUCATION AT THE DEPARTMENT

STUDY PROGRAMS

Bachelor's degree:

- Technology of environmental protection
- Environmental Management
- Management of technical and environmental risks

Master's degree:

- Technology of environmental protection
- Environmental Management

Number of the students

first year of bachelor's study:

- 52 internal form of study

second year of bachelor's study:

- 52 internal form of study
- 10 external form of study

first year of engineering study:

- 31 internal form of study
- 22 external form of study

PhD. degree:

- Technology of environmental protection

Number of the students on the study programmes guaranteed by the department (2011/2012):

Bachelor's degree: 74

on the study programs guaranteed by the department:

- 53 students internal
- 21 students external

Master's degree: 87

on the study programs guaranteed by the department:

- 55 students internal
- 32 students external

PhD. degree:

- 4 PhD. students in the internal form of study (defended PhD. thesis)
- 8 PhD. students in the external form of study (defended PhD. thesis)

GRADUATE PROFILE

BACHELOR'S PROGRAMS (Bc.)

Technology of environmental protection

Greening in the engineering must be focused on a complex life cycle from design through its stages of production and consumption to disposal for its survival. To this end, graduates receive, not just Bachelors fundamentals of environmental engineering, but also comprehensive knowledge in the field of environmental protection technology aimed at greening in the area of mechanical engineering. Study program is taught in daily form and in the distance form.

Environmental Management

The study is designed so that graduates could work with information sources, they knew they evaluate and effectively use and master the different communication tools. Students get knowledge of computer technology and its application possibilities in environmental protection.

Graduates of the Department of Environmental Management have knowledge of the variability of the operation of the man - environment. They can define the environmental problems, prioritize their problems and to the efficient operation and saving people in the environment. They are qualified to work with all age groups of the population in order to shape their environmental awareness. Study program is taught in daily form and in the distance form.

Management of technical and environmental risks

The structure of the study program "Management and technical environmental risks" is primarily focused on the possibility of its graduates to pursue in a wide range of corporate, public and the central government sector with a focus on industrial technology. The structure of the study program enables to graduates of study program to be ready to study in II. Degree/ step of university study and with possible profiling of graduates by compulsory optional courses, especially for quality programs Quality production (Engineering of Quality Production), Safety of Technical Systems, Environmental Management or Environmental Engineering of Environment. The graduates will have a general knowledge from the area of mechanical engineering and from wider range of management activities. They are not closely profiling, which allows them to wider application also in the labour market.

MASTER'S PROGRAMS (Ing.)

Technology of environmental protection

The study is focused on issues of development and environmental protection. Students after a common basis of science and engineering studies are profiling on the impact of machine production on the environment, treatment of industrial waste, machinery and equipment for environment, greening of products and production processes, monitoring of environmental technology and protection of the biosphere. Study program is taught in daily form and in the distance form.

Environmental Management

Graduates of the Department of Environmental Management have knowledge of the variability of the operation of the man - environment. They have knowledge of environmental aspects and impacts, they know the principles of rational use of natural resources and regulatory limits and standards for the environment. The knowledge they can apply in managing environmental processes, including the prevention of environmental risks and accidents. Study program is taught in daily form and in the distance form.

PhD. PROGRAMS (PhD.)

Technology of environmental protection

Studying in the third level Degree in Technique of environmental protection and equipment is designed to prepare highly qualified specialists of scientific research and development in all areas and workplaces, where they apply scientific knowledge of the all fields of creation and environmental protection. Doctoral program, and III study program degree focuses on the acquisition of knowledge based on current scientific knowledge in the field. The study is a reflection of individual creative student activities in scientific research and his own contribution to scientific knowledge. PhD. students in their studies dealing with the science and research development and environmental protection. They deal with monitoring, objectivization and evaluation of the environment. They work in various scientific and research projects. The standard length of study for a doctoral program in full - time is 3 years and, the distance form of more than 5 years.

LIST OF COURSES GUARANTEED BY THE DEPARTMENT

Technology of environmental protection

- | | |
|--|--|
| ✓ Assessment of Environmental Impacts | ✓ Environmental Management Systems |
| ✓ Basics of Environmentalistics | ✓ Environmental Safety of Workplaces |
| ✓ Basics of Toxicology | ✓ Environmental Toxicology |
| ✓ Computer Support of Environmental Protection Control | ✓ Environmet and Engineering Production |
| ✓ Constatnly Sustained Progress | ✓ Ergonomics |
| ✓ Diploma Project | ✓ Final Project |
| ✓ Diploma Thesis | ✓ Lagislative Aspects of Environmental Productions |
| ✓ Ecologization of Products and Production | ✓ Machines and Machinery |
| ✓ Ecologization of Products and Production | ✓ Machines and Machinery to Environmental Protection I. |
| ✓ Engineering of Protection of Water and Soil | ✓ Machines and Machinery to Environmental protection II. |
| ✓ Environment and Industrial Production | ✓ Methodology of Environmental Impacts Assessment |
| ✓ Environmental Engineering | ✓ Monitoring and Diagnostics of Environment |
| ✓ Environmental Legislation | |

- ✓ Noise and Vibrations
- ✓ Objectivization of Environmental Factors
- ✓ Planning of Environmental Production
- ✓ Planning of Environmental Suitable Production
- ✓ Recycling Oriented Construction
- ✓ Recycling and Recycling Technologies I.

- ✓ Recycling and Recycling Technologies II.
- ✓ Semester Projekt
- ✓ Semestral Project
- ✓ Separate Processes
- ✓ Separate Processes
- ✓ Technics of Working Environment
- ✓ Technologies of Environment Protection
- ✓ Theory of Environmental Control
- ✓ Waste Management

Environmental management

- ✓ Accreditation and Certification in Environmentalistics
- ✓ Applied Chemics and Biochemics
- ✓ Assessment and Marking of Environmental Suitable Products
- ✓ Assessment of Activities Impact on Environment
- ✓ Assessment of Impact on Population Health
- ✓ Basics of Environmentalistics
- ✓ Basics of Toxicology
- ✓ Computer Applications I.
- ✓ Computer Applications II.
- ✓ Computer Networks and Database Systems for Environmentalistics
- ✓ Computer Networks for Environmentalistics
- ✓ Computer Support for Control of Environmental Protection
- ✓ Constantly Sustained Progress
- ✓ Diploma Project
- ✓ Diploma Thesis
- ✓ Ecodesign
- ✓ Ecologization for Products and Production
- ✓ Economical Efficiency of Environmental Management
- ✓ Environment and Engineering Production
- ✓ Environment and Industrial Production
- ✓ Environmental Engineering
- ✓ Environmental Legislation
- ✓ Environmental Management Systems

- ✓ Environmental Measurements Monitoring
- ✓ Environmental Politics and Legislation
- ✓ Environmental Toxicology
- ✓ Ergonomics
- ✓ Final Project
- ✓ Final Thesis
- ✓ Integrated Management of Environment
- ✓ Intelligent Production Systems
- ✓ Management of Risk of Chemicals
- ✓ Methodology of Assessment of Impact on Environment
- ✓ Monitoring and Diagnostics of Environment
- ✓ Planning of Environmental Production
- ✓ Planning of Environmental Production
- ✓ Prevention and Correction of Environmental damage
- ✓ Programming Systems
- ✓ Recycling Oriented Construction
- ✓ Semestral Project
- ✓ Systems of Environmental Management
- ✓ Systems of Environmental Protection and Control
- ✓ Technologies of Environmental Protection
- ✓ Theory and Proceedings of Control in Environmentalistics
- ✓ Theory of Control in Environmentalistics
- ✓ Waste Engineering

- ✓ Waste Engineering and Recycling Management

Management of technical and environmental risks

- ✓ Machinery and Equipment for Environmental
- ✓ Greening of Products and Production
- ✓ Recycling and Recycling Technologies
- ✓ Final Project
- ✓ Final thesis

GRADUATE THESES

BACHELOR'S THESES:

Technology of environmental protection

Bistika Ludvik	Waste management plan design for conditions of a gardening machinery service and store
Bobaľová Jana	Ergonomic workplace rationalization
Daxner Július	Environmental hazards estimation by Monte Carlo technique
Dobrotková Slávka	Evaluation of environmental quality using chemical analysis
Dohányos Róbert	Technical and economic assessment of the proposal of solar collectors for heating water in houses
Drotár Daniel	Evaluation of environmental and economic aspects of wind energy compared to conventional energy source
Dubová Silvia	Design methods for reducing dust in a selected workplace
Durajová Iveta	Realising the potential of solar energy in Slovakia
Ďurčov Branislav	Analysis of the methodology of control waste water
Frančiaková Veronika	Possibilities of increasing the efficiency of hot water in residential buildings
Gajdošová Lucia	Analysis of acoustic characteristics of products for household
Hreško Lukáš	International Commission on illumination and its importance in the design of lighting systems
Chylová Lucia	Classification of economic and environmental benefits of a classical house and passive
Kiselová Martina	Methodology for the subjective assessment of microclimatic parameters
Klimková Mária	Relationship of work and health, damage health
Kobzošová Lenka	Possibilities of using water power in selected area in Slovakia
Kondela Julián	Monitoring of mine waters in Medzev - Poproč - Nováčany
Kováč Tomáš	Environmental degradation affecting on polymers
Kulik Miloš	Analysis of intensity probe in experimental measurements of noise

Lopraisová Lucia	Possibilities of using spectrophotometry and spectroscopy in environmental protection
Mako Richard	Current methods of identifying noise and vibration sources and their application in practice
Maslaňáková Monika	Options psychoacoustic measurement of selected parameters in the manufacture of car
Medvecká Simona	Chemical analysis of environmental samples
Melková Jana	Analysis and structuring of advanced engineering production processes and technologies
Mikloš Martin	Technical - economic evaluation of electrical and electronical equipment waste recycling
Modráková Monika	Comparison of current methods for visualizing noise
Moravanský Radoslav	Designing of lightsystem in classroom using DIALUX software
Moravská Andrea	Using fuel cells in car industry
Mudrá Elena	Chromatography and its use in environmental protection
Novotný Miroslav	Health protection against electromagnetic radiation
Pačut Patrik	Evaluation of psychoacoustic perception by humans
Petrík Daniel	Wood waste as a potential for processing, production and heating with wood pellets and briquettes
Pirčáková Mária	Evaluation of the technological process for individual components of the environment
Pisko Peter	Assessment of psychoacoustic perception of selected noise sources
Roszka Lukáš	Options refining and biogas energy recovery
Ruda František	Ionizing radiation as a physical working environment factor
Rusnák Miroslav	Evaluation of car emissions based on emission controls
Sirotnáková Jana	Analysis and use of materials for construction of noise barriers
Stahovcová Dominika	Analysis of evaluation methods for assessing the quality of working environment
Šaková Ingrida	Analysis of measurement possibilities of dust in industrial environment
Šofranková Melinda	Comparison of different methods of degradation of polymers
Takáč Peter	The potential of using M.A.R.S. wind turbines
Tomko Tomáš	Conceptual design recycling line for wood waste and the creation of simulation model
Uhliarik Ivan	Objectification and evaluation of thermal - moisture microclimate in practice
Uporský Stanislav	Proposal for implementative approaches for recycling of old vehicles
Žatkovič Branislav	Methodology for application of the selected devices to visualize the sound

Environmental Management

Babjaková Jana	Recent trends in recycling plastics
Baranová Dana	Possibilities of using wind energy in the selected area in Slovakia
Baranová Júlia	Analysis of sample mineralization techniques
Bučková Katarína	Analysis of the radioactive substances in Slovakia after the Chernobyl nuclear power plant accident, their prognosis and the impact on the environment and health of residents
Dulebová Martina	Emission controls as a tool for improving quality of air
Ďžubarová Ľudmila	The effects of landfills on the environment and human health
Eperješiová Ľubomíra	Analysis of the current situation in the field of photovoltaic systems
Hegeduš Tomáš	Analysis of waste water from engineering industry
Holub Tomáš	Alternative fuel vehicles - a combination of gasoline - hybrid
Hudáková Andrea	Draft of the air conditioning house
Hujdičová Michaela	Evaluation of selected technological operation and its impact on the individual components of the environment
Hužvárová Martina	Environmental education and management in practice
Chnupa Jozef	Analysis tools used in environmental management
Ihnátová Michaela	Economic efficiency of electricity generated from photovoltaic Articles
Il'ková Slavomíra	Comparison of measurement methods in psychoacoustics and their application
Javorská Mária	Analyzing the technological procedures and processes in wastewater treatment
Jureková Zuzana	Options to increase power efficiency operation of ventilation equipment
Kinyiková Zuzana	Complex evaluation state of the environment close to the mechanical engineering production
Kocár Peter	Protection of groundwater in the railway junction of the Čierna nad Tisou
Kondáš Peter	Production of high purity oxygen electrolysis of water with retroactive use of energy
Kondor Miroslav	Application of technical support at building - up to municipal water supply and sewer systems in eastern Slovakia as sector of integrated management
Koscelníková Erika	Using of LED and OLED technology for lighting
Kováčová Zita	The use of biomass for heating buildings in the Slovak Republic
Lacková Zdenka	Ecochemistry and its use in environmental protection
Mačáková Martina	Ways and means of disposal and recycling of used oil and lubricants

Makišová Antónia	Solar houses - a comparison of active and passive systems, their advantages and disadvantages
Melník Róbert	Trends in the use of alternative fuels to power cars
Miškayová Daniela	Efficient and economic aspects of biomass in Slovakia
Nickelová Ivona	Statistical analysis of noise evaluation in work environment
Pisanská Miroslava	Illuminating of interior by daylight
Porvazník Ján	Analysis of unlocking the potential of biomass for electricity and heat
Porvazníková Zuzana	Monitoring of environment
Puškárová Mária	Biological effects of light on human in the working environment
Rusinková Erika	The impact of abandoned mines and technological processes on the environment
Schied Peter	Human interaction with the environment in terms of impact on the deterioration of the atmosphere
Sičáková Zuzana	Recycling of light sources - WEEE - Waste electrical and electronic equipment
Sobrová Martina	Environmental rehabilitation after ecological disasters
Sušková Alexandra	Possibilities of usage a construction and demolition waste as recycled material
Szemánová Monika	Environmental and safety risks of technological operational and design measures to eliminate them
Škultétyová Denisa	Analysis of environmental impacts of industrial production
Štapinská Daniela	Possibilities of using geothermal energy in Slovakia
Vašková Jana	Requirements for hygrothermal microclimate in workplace

MASTER'S THESES:**Technology of environmental protection**

Adamová Alžbeta	The impact of modernization of the railway line Žilina - Košice on the environment
Bartko Ján	The statistical evaluation of air quality status in selected location
Bartók Ladislav	The statistical evaluation of water quality status in selected river
Birošová Katarína	Proposal of equipment to uniform use of wind energy
Bodnárová Alexandra	The comparison of selected equipment for collecting respirable fraction of solid aerosols
Bodová Andrea	The project proposal psychoacoustic certificate
Čemanová Mária	Creating an algorithm and methodology of assessing the state of the environment near the not electrified track

Dlugošová Aneta	Integrated environmental - health impact assessment activities - case study
Dubovecký Ján	Analysis of geometry impact of samples on results of sound proofing properties measurement by Microflown measurement technique
Dzurišová Gabriela	Application of the weighing system for collecting waste in house area in Prešov
Eliašová Veronika	Analysis of electric motor frequencies through the use of acoustic camera and vibrodiagnostics
Ferková Juliána	Project of municipal wastewater treatment plants on the base of electrolytic principle
Ficová Zuzana	Assessment of the economic benefits of a lighting system based on LEDs
Goceliaková Mária	Methodology for the statistical evaluation of the Inter - laboratory comparison in acoustics
Haburajová Jana	Analysis of the environment conditions to the weight of filters for collecting solid aerosols
Hanudelová Jana	Comparison sound quality by the human perception and using the binaural measurement technique
Hegy Ladislav	The draft of relationships model and natural limits of sustainable development
Hričinová Romana	Logistic model on non - conventional energy sources use
Hutňan Vladimír	Monitoring of the progress towards sustainable development in the mechanical engineering by the indicators
Kappel Vojtech	Proposal of catamaran remote control for cyanobacteria collection
Kaššová Veronika	Analysis and design of methodology for determining the quality of the environment in areas affected by air
Kecskemétyová Loreta	Implementation of technical, technological and material devices of environmental protection during flows
Kincelová Zdenka	Analysis and research of sound frequencies in the direct and reflected sound field of closed area
Kocsis Jozef	Analysis of acoustical properties of sound proofing materials by Microflown measurement technique
Komárová Miroslava	Comparison of sound power measurement techniques of noise sources by sound intensity and sound pressure
Kováčová Katarína	The use of biomass for energy purposes in Slovakia
Kozel Lukáš	Proposal of protocol and methodology for determining the intensity of noise from air traffic in areas near airports

Kurjatníková Dana	Option analysis of the binaural measurement technique and evaluation psychoacoustical parameters
Ľuptáková Miroslava	Analysis of automobile noise sources through the use of acoustic camera and vibrodiagnostics
Markoš Karol	Draft noise action for quarrying materials
Matysová Zuzana	Measurement and determination of psychoacoustical parameters for selected device
Miňová Ivana	Technical - economic assessment of the proposal for the use of wind power electricity generation in a family house
Múdra Petra	Comparison of the measurement acoustics descriptor using regular sound analysers and binaural measurement technique
Parkánska Alena	Development of system dynamics in personal, social and global level for support of environmental friendly thinking in technical practice
Petro Marián	Role of environmental engineering and management in protection against flows
Pichnarčíková Ivana	Comparison and analysis of methods for visualization of noise sources
Rapčan Peter	Evaluation of noise control measures in the commercial center "Gallery" and proposal of measures to improve the acoustic conditions in the surrounding area
Richnavská Eva	The statistical analysis of separate waste collection in the selected location
Sedlická Mária	Comparison of available methodologies for environmental assessments on the exact technological processes in production engineering
Sepešiová Andrea	Application of the innovative approaches for municipal waste disposal and separated components and its impact to process efficiency
Simonová Dorota	Environmental - technical aspects, impacts and risks of floods
Smrek Matúš	Analysis and comparison of methodologies for determining the composition of municipal waste
Spišáková Nikola	Dynamic noise visualisation of the personal computer and proposal of the measures for noise emission reduction
Šiliga Stanislav	Regulation model of microclimate in work environment
Šipoš Michal	Ferrous scrap processing capabilities and high value of trace elements and his impact on environment
Štolcová Lenka	Evaluation of impact of electrolytic equipment on the occurrence of cyanobacteria in stagnant waters
Takáčová Dorota	Using methods of psychoacoustic experiments in optimizing audio product
Tomaško Martin	Measuring operating characteristics of heat pump
Tyborová Karina	Project of cleansing waters and biopower plant complex

Vasko Peter	Life cycle assessment of a simple mechanical engineering product
Žabková Lenka	Psychoacoustic experiments and statistical evaluation
Židay Róbert	Research and design of acoustic material on the principle of Helmholtz resonator

Environmental Management

Čebrenáková Oľília	Treatment of stabilized sludge in sewage treatment plants within the VVS and Košice
Čigáš Miroslav	Implementation of standardized environmental management systems in the industrial organizations
Gdovin Milan	Engineering product design regarding to environmental parameters
Horváthová Ivana	The draft scheme for inter - laboratory comparison for measurement and objectification of employee exposure to solid aerosols in the working environment
Lazarová Petra	Impact of U.S. STEEL Košice, s.r.o. immission pollution to surrounding environment
Matiová Veronika	The environmental dimension of sustainable development university
Melišková Monika	Interpretation and comparison of light - technical projects created in the simulation programs and Relux Dialux
Muskalayová Miriama	Comparison of application methods for measuring the acoustic parameters of materials
Puk Peter	Effect of "Kosice integrated transport" on environmental quality in Kosice
Puzderová Dominika	Implementation of environmental management according to EMAS III in Slovakia
Repčoková Denisa	Integrated Environmental auditing - management systems and his standardization
Selecká Lenka	System recovery of packaging and packaging waste in Slovakia and in selected EU countries
Šefčík Maroš	Evaluation of the impact of thermal - humidity microclimate parameters on the working environment comfort / discomfort
Tirpáková Miriama	Assessment of the newly proposed activities on the environment - a case study
Vajda Richard	Possibilities for noise reduction of the vehicles by the use of noise visualisation and determination of psychoacoustic parameters
Zajacová Viktória	The impact of emitted emissions from air aggregates on the environment
Baláž Dávid	Measurement analysis of the electrical hand tools by the use different ways of mounting sensors

Bryndza Pavol	Analysis of the production process windows and their impact on the environment
Dobiašová Monika	Problem analysis and design of wastewater disposal solution for a particular community
Fedorová Jana	Proposal for solutions to streamline the waste water in selected company
Gregušová Anna	Proposal for the recovery of biowaste
Hospodárová Jana	Project implementation of hot water and pool support for solar systems
Kopnická Kamila	Analysis of personal protective equipment for protection the respiratory organs and their effectiveness
Krištofová Beáta	Implementation of ecodesign project according to the criteria proposed with regard to environmental parameters
Lešková Marianna	Light as one of the basic components of the environment
Midová Alexandra	The impact assessment of dupm construction in Michalovce on the environment
Pallai Ján	Environmental management - risk energy electromagnetic radiation
Paulišin Marek	Assessment plan for the Center for the collection and recovery of waste material in the city Sečovce
Regecová Monika	Logistics management of waste from single guise health
Rouffet Natália	The application of less formal instruments for environmental management in specific conditions
Rovňáková Jana	Application of thermovision in fields of electrical wiring failure prevention
Tancár Michal	Environmental and economic efficiency of an alternative method of heating the station Krompachy
Vološinová Mária	Computer aided design of lighting systems (in software RELUX)
Zat'ková Anna	Technical - ecological assessment of the importance of heat pump applications
Žeňuchová Martina	Socio - economic impact analysis of changes in technology on the environment

PhD. THESES:**Technology of environmental protection**

Babušová Eva	Implementation of environmental management systems as a tool for efficiency and competitiveness of organizations
Franko Štefan	Proposal of methodology for identifying energy losses of buildings using thermography
Farkašovská Zuzana	Research and development of the methodology of improving acoustic quality products

Kevická Katarína	Reducing of energy consumption of lighting systems of mechanical engineering plants in terms of efficiency and ecologisation of working environment
Beneová Anna	Analysis of the stressful working environment factors and their optimization in terms of engineering companies
Čekan Pavol	Developing methodologies for assessing and reducing vibrations in the environment
Piňosová Miriama	Development of methodology for assessing the impact of environmental factors on human health
Sabol Jozef	Methods of dust mass concentration measurement and balance of the dust emission in air

RESEARCH AT THE DEPARTMENT

Area of research:

- ✓ Physical factors of working environment.
- ✓ Chemical factors of working environment.
- ✓ Ergonomy.
- ✓ Environmental protection technologies.
- ✓ Implementation and modification of technology for reducing cyanobacteriums in backwaters.
- ✓ Environmental measurement and monitoring
- ✓ Environmental management systems
- ✓ Assessment of environmental impacts
- ✓ Ecologization of products and production
- ✓ Recycling oriented construction
- ✓ Planning of environmental production
- ✓ Waste management
- ✓ Objectivization and visualization of environmental factors

Research characteristics:

Research of the department is directed to the greening of products and production, environmental design of production systems, techniques and technologies for production and environmental protection and management of environmental aspects and impacts of monitoring, simulation, computer support, assessment, evaluation and optimization.

The scientific - research activities are oriented to the principles of recycling - oriented production and engineering evaluation of the environmental profile, methods of evaluation of environmental products and productions, waste water treatment methods, modeling removal products and recycling of logistics etc.

Areas of expertises:

- | | |
|---|-----------------------------------|
| ✓ Processing of assessments for the assessment of environmental impacts | ✓ Thermal - humidity microclimate |
| ✓ Acoustic and vibrations | ✓ Light and illumination |
| | ✓ Noise maps |
| | ✓ Thermovision |

- ✓ Electro - magnetic radiation
- ✓ Acoustic characteristics of materials
- ✓ Environmental management
- ✓ Environmental impact assessment
- ✓ Pollutions measurement
- ✓ Odors and volatile organics compounds
- ✓ Working performance and productivity

PROJECTS OF THE DEPARTMENT

Title of the project **Implementation and modification of technology for reducing cyanobacteriums in backwaters**

Type of the project OP Research and Development,

Project number ITMS: 26220220028

Principal investigator prof. Ing. Dušan Šebo, PhD.

Time period of the project 2010 - 2013

Annotation of the project Main aim of project is to apply unconventional technology to reduce

eutrophication of stagnant water, contaminated mainly cyanobacteria and lower eyelids. Project activities are focused on themodification and adaptation of existing equipment and the Faculty of Mechanical Engineering, Technical University of Kosice, which was used for wastewater treatment in the previous work of the Department of Environmental and Process Control. The device will be used for experimental purposes and doctoral education in science and environment and industrial engineering education station. Expected outcomes are mainly in verification technology, but also new patent solutions, publicity activities and transfer the acquired knowledge into practice.

Title of the project **Management Research Centre for technical, environmental and human risks for sustainable production and products in engineering**

Activity 1.2. Design of knowledge center to knowledge base support for the objectification of working environmental factors

Type of the project ESF – European structural funds

Project number ITMS 26220120060

Principal investigator Dr.h.c. prof. Ing. Miroslav Badida, PhD.

Time period of the project 10/2010 – 10/2013

Annotation of the project In the present the existing database represents large amount of knowledge, experience and information that refer to objectification and estimation of environmental factors. There were gained theoretical knowledge by realized research, and also experience pursuant to which we can create basics of knowledge. There are many experienced workers at

workplace, who are specialists in particular specific areas of environment and working environment, whose actual experience and theoretical knowledge represents high entry value of project and guarantee not only creating of quality knowledge basis in the research process, but also knowledge centre. Gained information will create knowledge basis for objectification of environmental factors, which will be implemented during creating of situational models of environmental risk in industrial workplaces. During realizing this phase will be work out situational models of environmental risk which will be basics for control and effective elimination of environmental risk and for safety planning of industrial workplaces and products. To achieve this activities, we need to harmonize with legislative requirements and therefore it is necessary in frame of this activity to obtain normative literature, methodical operations, and technical foreign and home literature.

NATIONAL PROJECTS

Title of the project	Using of the results of Scientific - research activities in teaching proces of "Fundamentals of Environmental" and "Environmental Engineering" with using of Multimedia Technology
Type of the project	Grant project KEGA
Project number	049TUKE - 4/2012
Principal investigator	Dr.h.c. prof. Ing. Miroslav Badida, PhD.
Time period of the project	2012 – 2014
Annotation of the project	Proposed project is aimed for the use of the results from scientific - research activities of researches workplace, international partners and results and knowledge's and experiences selected international universities by the teaching process of "Fundamentals of Environmental" and "Environmental Engineering" with using of multimedia technology. The work will emerge from a consistent analysis of state of art this problematic and study of approaches to the problematic on top international universities. It will be implemented all the knowledge's and experience obtained in these workplaces. It would be created preconditions for extension of the scientific - research laboratories / non - ionizing radiation, thermography, lighting, dust monitoring .../ and also personnel, technical, software and methodical conditions for successful accreditation of ties laboratories. It would be transfer practical knowledge's of the researcher of the projects obtained by solving a wide range of research tasks, or tasks for praxes in to teaching process for effective support of multimedia technologies. It would be dedicated advanced university books "Fundamental of Environmental"

and "Environmental Engineering". It would be significant strengthening the laboratory work of students on our faculty.

Title of the project	ICT aided new forms of learning and increasing the efficiency of education for environmental study programs
Type of the project	Grant project KEGA
Project number	032TUKE - 4/2012
Principal investigator	doc. Ing. Ružena Králiková, PhD.
Time period of the project	2012 - 2014
Annotation of the project	Modern information and communication technologies (IKT) bring globally significant changes in the educational process. Compared to the traditional forms of education they enable to achieve higher effect and often have motivational nature for students. The project focuses on the application of new lecturing methods and enhancing the effectiveness of learning with support of IKT. By realisation of the project it is expected to create and access educational web site dedicated to specific problem in the field of environment protection technologies area as the knowledge base of several subject of study programs of the 1st, 2nd and 3rd degree of university study. Realisation of the project will lead to implementation of knowledge and experience of investigators in the educational process and conditions for improving and streamlining the existing forms of education.
Title of the project	Create a professional profile of scientific research portal platform "Acta Mechanica Slovaca"
Type of the project	Grant project KEGA
Project number	064TUKE - 4/2011
Principal investigator	Ing. Beáta Hricová, PhD.
Time period of the project	2011 - 2013
Annotation of the project	The target of the project is to design a portal system processing scientific research results employees and students of the faculty for knowledge increasing and cognitive level, that defines the real knowledge limiting orientation of research areas as information and knowledge results in terms of factual and reprographic sources available for the entire scientific community.
Title of the project	Research and development of application procedures for solution of acoustic design for industrial products
Type of the project	Grant project VEGA

Project number	VEGA 1/1216/12
Principal investigator	prof. Ing. Ervin Lumnitzer, PhD.
Time period of the project	2012 - 2014
Annotation of the project	Technical properties of the industrial machines, devices and products are today still increased and customers also require fulfillment of the properties which increase their environmental quality. One of the most important characteristics is acoustic design. Technical acoustic and its development is nowadays very actual topic. Market requires products optimization not exactly only for quantity but also for the quality of the emitted noise. The important role is also psychoacoustics parameters, such as roughness of the noise, spectral characteristics, sharpness and timbre. Output noise emitted by the machines or devices can not disturb the people, often is required the level of the acoustic impulses and the properties have to be designed with applicable qualities of the emitted noise that is characterized by the acoustic design. Important role in these field represents nonspecific effects of the noise to human as non hearing effects.

INTERNATIONAL PROJECTS

Title of the project	Development and improvement of automotive and urban engineering studies in Serbia - DIAUSS
Type of the project	TEMPUS project
Project number	TEMPUS: JP 516729 - 2011
Principal investigator	prof. Ing. Ervin Lumnitzer, PhD.
Annotation of the project	The project deals with the development and improvement of the impact the automotive industry on the urbanized territory of Serbia. The project solves transport infrastructure, construction of urban settlements, as well as structure of transport and technical parameters of the current vehicles. Manufacturers of cars, architects, designers, but also designers and technicians enter to the project. The project result will be optimized transport infrastructure with minimized technical, economic and environmental impacts on the population.

VISITS OF STAFF MEMBERS TO FOREIGN INSTITUTIONS

Employees and students	Country
Králiková Ružena, doc. Ing., PhD.	Poland, Czech Republic
Babušová Eva, Ing.	Poland

Franko Štefan, Ing.	Poland
Džoganová Zdenka, Ing.	Poland, Hungary
Ruman Peter, Ing.	Hungary
Sokolová Hana, Ing.	Poland
Rusinová Lenka, Ing.	Czech Republic
Polačeková Jana, Ing.	Czech Republic

MEMBERSHIP IN SLOVAK PROFESSIONAL ORGANISATIONS

Automotive Industry Association of the Slovak Republic – Environmental Legislative ENLA

Badida Miroslav, Dr.h.c. prof. Ing., PhD.

Slovak Acoustical Society

Lumnitzer Ervin, prof. Ing., PhD.

Biľová Monika, Ing., PhD.

Liptai Pavol, Ing., PhD.

Journal “Fyzikálne faktory prostredia” - Physical Environmental Factors

Lumnitzer Ervin, prof. Ing., PhD.

Slovak Society for Environmental Technics

Ingrid Šenitková, prof. Ing., CSc.

Slovak Green Building Council

Ingrid Šenitková, prof. Ing., CSc.

Journal „Acta Mechanica Slovaca“

Badida Miroslav, Dr.h.c. prof. Ing., PhD.

Piňosová Miriam, Ing., PhD.

TK 58 Thermal Building Protection at SOMT

Ingrid Šenitková, prof. Ing., CSc.

TK 59 Climatization and Air - condition Equipments at SOMT

Ingrid Šenitková, prof. Ing., CSc.

TK 112 Sustainability of buildings at SOMT

Ingrid Šenitková, prof. Ing., CSc.

Journal „Strojárstvo“ – Mechanical Engineering

Badida Miroslav, Dr.h.c. prof. Ing., PhD.

SASI Slovak Association of Mechanical Engineers at the Association of Slovak Scientific and Technological Societies

Badida Miroslav, Dr.h.c. prof. Ing., PhD.

Sobotová Lýdia, doc., Ing., PhD.

Králiková Ružena, doc., Ing., PhD.

Slovak Light - Technical Association at the Association of Slovak Scientific and Technological Societies

Králiková Ružena, doc., Ing., PhD.

MEMBERSHIP IN INTERNATIONAL PROFESSIONAL ORGANISATIONS

European Acoustic organization

Lumnitzer Ervin, prof. Ing., PhD.

ISIAQ International Society of Indoor Air

Quality and Climate

Ingrid Šenitková, prof. Ing., CSc.

ISBE International Society of Built Environment

Ingrid Šenitková, prof. Ing., CSc.

IAHS International Association for Housing Science

Ingrid Šenitková, prof. Ing., CSc.

Journal Acta Polytechnica Hungarica

Badida Miroslav, Dr.h.c. prof. Ing., PhD.

Member of Editor Cometeet

ICEEE International Council of Environmental**Engineering Education, Budapest, Hungary**

Badida Miroslav, Dr.h.c. prof. Ing., PhD.

DAAAM International Vienna

Badida Miroslav, Dr.h.c. prof. Ing., PhD.

Králiková Ružena, doc., Ing., PhD.

Journal of Engineering**Hunedoara, Romania**

Badida Miroslav, Dr.h.c. prof. Ing., PhD.

Member of Editor Cometeet

European Strategy Forum on Research Infrastructures ESFRI, Brussel, Belgium

Badida Miroslav, Dr.h.c. prof. Ing., PhD.

PUBLICATIONS**Books**

- [1] KMEC, Ján - SOBOTOVÁ, Lýdia - DOBROVIČ, Ján - BIČEJOVÁ, Ľuba - GOMBÁR, Miroslav: **Categories of Hydroerosion Factors** - 1. vyd. - Ludenscheid: RAM – Verlag. (2012), p. 153. ISBN 978 - 3 - 942303 - 11 - 8

Textbooks

- [1] LUMNITZER, Ervin - BADIDA, Miroslav - POLAČEKOVA, Jana: **Objektivizácia a hodnotenie faktorov prostredia základy psychoakustiky**, Košice, Elfa. (2012), s. 121. ISBN 978 - 80 - 8086 - 172 - 8.
- [2] LADOMERSKÝ, Juraj - HRONCOVÁ, Emília - SAMEŠOVÁ, Dagmar - BADIDA, Miroslav: **Odpadové inžinierstvo Environmentálne vhodné energetické zhodnocovanie odpadov**. Zvolen: Technická univerzita vo Zvolene. (2012), s. 298. ISBN 978 - 80 - 228 - 2309 - 8

Journals

- [1] LEDECKÝ, Valent - KŇAZOVICKÝ, Dávid - BADIDA, Miroslav - DULEBOVÁ, Ľudmila - HLUCHÝ, Marián - HORŇÁK, Slavomír: **Mechanical testing of orthopaedic suture material and a crimp clamp system for the extracapsular stabilisation of canine cruciate - deficient stifles** - 2012. In: Veterinárna medicína. Vol. 57 (2012), p. 597 - 602. - ISSN 0375 - 8427
- [2] REMETEIOVÁ, Dagmar - RUSNÁK, Radoslav - KUCANOVÁ, Eva - FIOOVÁ, Beáta - RUŽICKOVÁ, Silvia - FEKETE, Ilona - HORVÁTH, Márk - DIRNER, Vojtech: **Environmental study of two significant solid samples: gravitation dust sediment and soil** - 2012. In: Environmental Monitoring and Assessment. Vol. 184 (2012), p. 1121 - 1130. - ISSN 0167 - 6369
- [3] ŠEBO, Dušan - PETRIKOVÁ, Andrea: **Praktyczne aspekty wykorzystania metody podziału i ograniczeń do optymalizacji zapasów** - 2012. In: Magazyn

Przemysłowy. Vol. 115 (2012), p. 42 - 44. - ISSN 0945 - 5485.

- [4] ŠEBO, Dušan - PETRIKOVÁ, Andrea - ŠEBO, Juraj: **Supply optimization in the case of deterministic uneven consumption** - 2012. In: Journal of Production Engineering. Vol. 15 (2012), p. 73 - 76. - ISSN 1821 - 4932
- [5] PETRIKOVÁ, Andrea - ŠEBO, Dušan - SABADKA, Dušan: **Optimization of logistics processes using XYZ method** - 2012. In: Machines, Technologies, Materials - 2012 Vol. 6 (2012), p. 1 - 4. - ISSN 1313 - 0226
- [6] DULEBOVÁ, Ľudmila - BADIDA, Miroslav - DULEBA, Branislav: **Influence of environment on bending stress of composite with reggranulate** - 2012. In: Annals of Faculty Engineering Hunedoara. Vol. 10 (2012), p. 153 - 156. - ISSN 1584 - 2665
- [7] LUMNITZER, Ervin - BIL'OVÁ, Monika: **Use of Recycled Materials for Noise Reduction** - 2012. In: Akustika. Vol. 17 (2012), p. 22 - 26. - ISSN 1801 - 9064
- [8] DOMNIȚA, Florin - MUNTEA, Cornel - KAPALO, Peter - PAULIKOVÁ, Alena: **Creșterea eficienței instalațiilor de ventilare - climatizare din spitale prin utilizarea unor noi criterii de proiectare** - 2012. In: Știința modernă și energia: Producerea, transportul și utilizarea energiei. Vol. 31 (2012), p. 218 - 223. - ISSN 2066 - 4125
- [9] KAPALO, Peter - PAULIKOVÁ, Alena - MUNTEA, Cornel - DOMNIȚA, Florin: **Evaluation of ventilated rooms** - 2012. In: Știința modernă și energia: Producerea, transportul și utilizarea energiei. Vol. 31 (2012), p. 232 - 238. - ISSN 2066 - 4125
- [10] KAPALO, Peter - PAULIKOVÁ, Alena - MUNTEA, Cornel - DOMNIȚA, Florin: **Quality of air in ventilated room** - 2012. In: Știința modernă și energia: Producerea, transportul și utilizarea energiei. Vol. 31 (2012), p. 239 - 244. - ISSN 2066 - 4125

- [11] MUNTEA, Cornel - DOMNIȚA, Florin - KAPALO, Peter - PAULIKOVÁ, Alena: **Câteva considerații privind ventilarea și climatizarea unui spital nou construit** - 2012. In: Știința modernă și energia: Producerea, transportul și utilizarea energiei. Vol. 31 (2012), p. 266 - 270. - ISSN 2066 - 4125
- [12] LUMNITZER, Ervin - BEHÚN, Marcel - BIL'OVÁ, Monika: **Evaluation of maglovec quarry by application of visualization techniques to emissions of noise for developing anti - noise measures** - 2012. In: Annals of faculty engineering Hunedoara - International Journal of Engineering. Vol. 10 (2012), p. 183 - 186. ISSN 1584 - 2673
- [13] BIL'OVÁ, Monika - LUMNITZER, Ervin: **Influence of sampel size by sound absorption coefficient determination** - 2012. In: Acta Technica Corviniensis: Bulletin of Engineering. Vol. 5 (2012), p. 45 - 46. - ISSN 2067 - 3809
- [14] BADIDA, Miroslav - BARTKO, Ladislav - LUMNITZER, Ervin - SZABÓ, Róbert: **Proposals of methodology for measuring selected acoustic descriptors.** - 2012. In: Annals of Faculty Engineering Hunedoara: International Journal of Engineering. Vol. 10 (2012), p. 39 - 46. - ISSN 1584 - 2665
- [15] BIL'OVÁ, Monika - LUMNITZER, Ervin: **Tyre radiated noise level influenced by road surface quality** - 2012. In: Machines, techno - logies, materials. Vol. 6 (2012), p. 46 - 48. - ISSN 1313 - 0226
- [16] ANDREJIOVÁ, Miriam - KRÁLIKOVÁ, Ružena - WESSELY, Emil - SOKOLOVÁ, Hana: **Assessment of the microclimate in the work environment** - 2012. In: DAAAM International Scientific Book 2012. Vol. 11 (2012), p. 509 - 516. - ISSN 1726 - 9687
- [17] RUSKO, Miroslav - KRÁLIKOVÁ, Ružena: **Implementation of environmental management systems in the Slovak enterprises** - 2012. In: DAAAM International Scientific Book 2012. Vol. 11 (2012), p. 369 - 378. - ISSN 1726 - 9687
- [18] KRÁLIKOVÁ, Ružena - RUSKO, Miroslav - WESSELY, Emil: **Framework for applying six sigma methods within environmental management** - 2012. In: DAAAM International Scientific Book 2012. Vol. 11 (2012), p. 545 - 552. - ISSN 1726 - 9687
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- [21] PIŇOSOVÁ, Miriama - ANDREJIOVÁ, Miriam - LUMNITZER, Ervin: **Analýza klinických príznakov synergie pôsobenia hluku a vibrácií na zdravie človeka v prevádzkach s ich vysokou expozíciou** - 2012. In: Pracovní lékařství. Vol. 64 (2012), p. 103 - 111. - ISSN 0032 - 6291
- [22] ČULÁKOVÁ, Monika - ŠENITKOVÁ, Ingrid - PAULIKOVÁ, Alena: **Optimization of construction solutions for green buildings** - 2012. In: Pollack Periodica. Vol. 7 (2012), p. 33 - 44. - ISSN 1788 - 3911
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priemyselného podniku s expozíciou hluku a vibrácií metódou dotazníkového šetrenia - 2012. Zvolen: TU. (2012), s. 151 - 156. - ISBN 978 - 80 - 228 - 2371 - 5

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Department of Power Engineering



Contact

The head: Horbaj Peter,
prof. Ing., PhD.
E - mail: peter.horbaj@tuke.sk
Address: Vysokoškolská 4,
042 00 Košice, SR
Phone no.: +421 55 602 2451
Fax.: +421 55 602 2452



Staff

- Professors: 2
- Assoc. Professors: 2
- Assist. Professors: 4
- Researchers: 1
- PhD. Students: 2 internal, 5 external

Activities at the department

Date	Title of the event, activity characterizing the life at the department in 2012
1/2012	Lecture of a representative of Atlas COPCO (Ing. Juraj Novodvorský)
2/2012	Lecture of a representative of Buderus (doc. Ing. Michal Strama, CSc.)
3/2012	Lecture of an energy auditor (Ing. Ľudovít Tkáčik)
5/2012	Lecture of a representative of Dalkia Eastern Slovakia (Ing. Ľuboš Kertész)
10/2012	Lecture of a representative of SWEP Slovakia s.r.o. (Dipl. Ing. Igor Ďurčanský)
11/2012	Lecture of a representative of FMMI VŠB TU Ostrava (prof. Ing. Miroslav Příhoda, CSc.)

EDUCATION AT THE DEPARTMENT

STUDY PROGRAMS

Master's degree:

- Power Machines and Equipments

PhD. degree:

- Power Machines and Machinery

Number of the students

(till 30. 10. 2012) on the study programs guaranteed by the department:

first year of study:

- 11 internal form of study
- 10 external form of study

second year of study:

- 19 internal form of study
- 6 external form of study

Number of the graduates (2011/2012)

on the study programs guaranteed by the department:

- 6 students in the internal form of master's degree
- 7 students in the external form of master's degree
- 4 PhD. students in the internal form of study (defended PhD. thesis)
- 1 PhD. student in the external form of study

GRADUATE PROFILE

MASTERS'S PROGRAM (Ing.)

Power Machines and Equipments

The alumnus of the study programme will receive 2nd stage of study's knowledge in order to perform qualified solution of problems in the wide area of power engineering; focused on the mechanical engineering, metallurgy, ecology and economic and legislation aspects. The knowledge is supported by modern information technologies; at activities related to the production, distribution, projection and operation in various companies and institutions concerning power engineering.

PhD. PROGRAM (PhD.)

Power Machines and Machinery

The study of the third stage of university study is focused on preparation of high - qualified employees of scientific research and development in the all fields of power engineering. Doctoral study programme, as the study programme of the third stage of study, is focused on receiving knowledge based on the present state of scientific knowing in the given area. The study is reflection of independent creative activity of a student at scientific research and his/her own contribution to scientific knowledge. Standard length of the doctoral study for internal students is at least 3 years and maximum 4 years; for external students maximum 5 years.

LIST OF SUBJECTS GUARANTEED BY THE DEPARTMENT

- | | |
|---|---|
| ✓ Audits, Certifications and Legislation in Power Engineering | ✓ Heat and Mass Transfer |
| ✓ Cogeneration Systems | ✓ Heat Supply |
| ✓ Combustion Equipments and Heat Exchangers | ✓ Industrial Pneumatic Technology |
| ✓ Computational Support of Power Equipments Projection I. | ✓ Industrial Pollution Control |
| ✓ Computational Support of Power Equipments Projection II. | ✓ Measuring and Measurement Methods in Power Engineering |
| ✓ Cooling Equipments and Heat Pumps | ✓ Measurement, Control and Automation of Heat Processes |
| ✓ Design of Power Equipments I. | ✓ Modelling and Simulation of Heat Processes |
| ✓ Design of Power Equipments II. | ✓ Performance and Maintenance of Power Equipments |
| ✓ Diagnostic Methods in Power Engineering | ✓ Pumps, Compressors |
| ✓ Diploma Project | ✓ Semester Project |
| ✓ Diploma Thesis | ✓ Steam, Gas and Water Turbines |
| ✓ Energy Management | ✓ Technical Equipments for Ventilation and Air Conditioning |
| ✓ Energy Resources and Conversion | ✓ Waste Disposal in Power Engineering |
| ✓ Foundations of Nuclear Power Engineering | ✓ Water Economy |
| ✓ Fuel Economy | ✓ Working Environment Technology |

GRADUATE THESES

MASTER'S THESES:

Bolna Peter	Energy utilization of selected type of waste in the plasma reactor
Elayeb Salahdeen Mohammed Salem	Calculation and design of air conditioning system for a typical family house in Libya
Eštočinová Lenka	Efficiency check of the selected heating system
Ivanová Kamila	Trend of new technologies development and their impact on the future natural gas consumption, actual energy mix, its perspective in terms of the EU and Slovakia
Kavulič Miroslav	Design of vortex tube with regard to maximization of cooling capacity
Lukács Gabriel	Determination of the characteristics of the selected valve
Mák Dávid	Energy recovery of PET bottle waste
Soloninka Patrik	Analysis of pyrolysis operation conditions impact of used tires on the quality of pyrolysis gas, solid residues and liquid fractions of pyrolysis
Thúr Ondrej	Peltier cell in the process of electronic component cooling
Trifon Marek	Design of solar power plant parameters with active lightning conductor
Vajdík Martin	Options control the hydraulic conditions of heating system and its impact on the quality of supply in terms of district heating
Varga Vincent	System design for sucking off the fumes from welding workshop with the possibility of heat recovery
Záhorský Peter	Energy intensity evaluation for hot water supply after pipeline insulation in the selected house

PhD. THESES:

Azariová Katarína	Heating and hot water preparation from the aspect of evaluation "Power economy of buildings on the purpose of their certification
Čekanová Patrícia	Energy evaluation of agricultural production waste
Fedorko Ľuboš	Determination of actual parameters of combustion turbine in time
Gallik Róbert	Research of heat exchangers of polypropylene fibres
Koško Marcel	Mathematical analysis of producing nitrogen oxides in combustion of solid fuels based on applying the theory of modelling phenomena
Kubík Michal	Research of the shape influence of the natural gas cooler's outer heat - exchanging area on its cooling performance
Kurilla Peter	Thermodynamic study of wastes gasification possibilities in plasma reactor

Lázár Marián	Research of municipal waste utilization possibilities in the plasma reactor
Lengyelová Marta	Research the possibility of using the plasma reactor to produce electricity and heat from municipal solid waste
Nováček Erich	The proposal of solar power plants for the conditions in Slovakia
Popčáková Daniela	Optimization of flow parameters in the selected cooling system

RESEARCH AT THE DEPARTMENT

Area of research:

- ✓ Plasma technology
- ✓ Renewable energy sources
- ✓ Plasma treatment of dangerous wastes.
- ✓ Storage of excessive electric power made of alternative energy sources; in the form of hydrogen.
- ✓ Research of intensification of storage capacities of hydrogen for adsorption and absorption materials.
- ✓ Research of cooling intensity of curved heat - exchanging areas.
- ✓ Filtration of natural gas before compression in the process of natural gas transport.
- ✓ Flow and heat transfer in natural gas coolers.
- ✓ Numerical simulations of heat transfer in specific technical applications and porous materials.

Research characteristics:

The research is focused on utilization and optimization of renewable energy sources. Emphasis was on hydrogen technologies which represent ecologically clean energy. In the framework of grant projects and projects funded by the European Structural Funds, utilization of solar power using photovoltaic cells in order to produce hydrogen, which is used as interlink in the process of energy storage, is solved. The research in the area of plasma treatment of wastes is solved too. This technology enables the dangerous waste to decrease its volume by high - temperature separation of thermally decomposable waste components.

On the basis of co - operation with industrial practice, the potential for solution of current issues from practice was created. The issues focused on the transport issues of natural gas which is related to filtration, compression and cooling of gas in compressor stations.

The department has high specialised staff altogether with doctoral students in order to solve tasks like these.

Areas of expertises:

- ✓ CAD systems (Pro - Engineer, Siemens NX, ...)
- ✓ CFD systems (ANSYS_CFX)
- ✓ Dimensional analysis
- ✓ Heat and mass transfer

- ✓ Hydrogen - processing technologies
- ✓ Mathematical and physical modelling of power engineering systems
- ✓ Mechanics of non - rigid materials (fluids)
- ✓ Thermodynamics
- ✓ Thermogravimetry

PROJECTS OF THE DEPARTMENT

Title of the project	Centre of efficiency research of integration of combined systems of renewable energy sources
Type of the project	OP Research and Development, Implementation of knowledge and technologies obtained by research and development
Project number	ITMS 26220220064
Principal investigator	prof. Ing. Peter Horbaj, PhD.
Time period of the project	03/2010 - 08/2012
Annotation of the project	Technology for utilization of hydrogen as an alternative fuel for the future. The actual application of photovoltaic panels as an energy source in the home is especially problematic for large investment costs and instability of sunshine. Perpendicular to the surface lands in Košice year we have 1275 - 1325 kWh.m⁻² per year. In doing so, the average incident solar radiation per day in August 2007 was approximately 6.83 kWh.m⁻² per day, but in December 2007 was only 0.206 kWh.m⁻² per day. Instability of performance is a problem especially during the daily fluctuations, where it is necessary to accumulate energy for lighting shortfalls article. When power loss occurs panel taking power from the battery, thus compensating for the daily delivery of inequalities. The problem with conventional electrical battery life is relatively low (much lower than that of the solar panel) and subsequent environmental problems arising from the disposal of batteries. Another disadvantage is the low energy storage capacity per unit volume. Therefore, as a good alternative solution seems to use hydrogen as medium in which energy is stored as chemical energy. The function of the PV unit is accumulating in the electrolytic production of hydrogen from water and excess energy for lighting would decrease subsequently consumes hydrogen to produce the necessary electricity in a fuel cell. Preferred is the use of electrolyzers and PEM fuel cells with membranes for their high efficiency. One of the advantages of involving the production of waste heat in fuel cells that could be used in the process of heating, as well as the use of pure oxygen, produced as a by product.

Title of the project	New technologies for waste treatment in plasma reactor
Type of the project	OP Research and Development, Implementation of knowledge and technologies obtained by research and development
Project number	ITMS 26220220044
Principal investigator	prof. Ing. Peter Horbaj, PhD.
Time period of the project	01/2010 - 06/2012
Annotation of the project	The Innovative output is plasma technology with cogeneration unit; based on the principle of waste gasification and heat and power production. It utilizes extremely high thermal flux from low - temperature plasma torch generated by electric field. The output of the process of gasification is usable side products, that is syngas, liquid metal and inert slag.

Title of the project	Package of innovative elements for the reform of the system of education at TUKE
Type of the project	OP Research and Development, Implementation of knowledge and technologies obtained by research and development as engines of wise society
Project number	ITMS 26110230018
Principal investigator	prof. Ing. Peter Horbaj, PhD.
Time period of the project	06/2010 - 02/2013
Annotation of the project	Preparation of study materials for teaching the study programmes guaranteed by the department in English language: Guarantors and teachers in cooperation with guarantors processed study materials of the subjects' curriculum in a world language and prepared study materials in a world language. Teachers, employees and research employees participated in the process of the preparation.

NATIONAL PROJECTS

Title of the project	Research of the causes of cooling performance decrease of natural gas coolers; development of methodology for their primary diagnostics and consequent eliminations
Type of the project	Grant VEGA
Project number	1/0006/11
Principal investigator	prof. Ing. Mária Čarnogurská, CSc.
Time period of the project	01/2011 - 12/2013

Annotation of the project

The main aim of the project is research of the causes of significant decrease of cooling performance of natural gas coolers during their long - term operation in the Slovak Republic; Creation of multi - purpose methodology for their diagnostics. The assumed cause of the decrease is cumulated deposit on the inner heat - exchanging area.

The methodology is to determinate deposit thickness on the inner heat - exchanging area and must be based on a non - destructive principle. Composition and physical properties of the deposit are not known. This makes the possibility of analytical assessment of the deposit effect on the cooling performance more difficult.

The subject of the project solution will also be experimental research of physical properties of the deposit. The developed methodology will consequently be verified by concrete types of coolers operated at particular compressor stations.

VISITS OF STAFF MEMBERS TO FOREIGN INSTITUTIONS

Employees and students**Country**

Čarnogurská Mária, prof. Ing., CSc.

Czech Republic (13. 5. 2012 - 16. 5. 2012)

Koško Marcel, Ing.

Czech Republic (6. 2. 2012 - 15. 2. 2012)

Lázár Marián, Ing.

Hungary (14. 06. 2012 - 14. 07. 2012)

Lengyelová Marta, Ing.

Hungary (14. 06. 2012 až 14. 07. 2012)

MEMBERSHIP IN SLOVAK PROFESSIONAL ORGANISATIONS

The Slovak Chamber of Auditors

Peter Horbaj, prof. Ing., CSc.

Plynár Vodár + Kúrenár (SK)

Peter Lukáč, Ing., PhD.

MEMBERSHIP IN INTERNATIONAL PROFESSIONAL ORGANISATIONS

Journal of Applied Science in the Thermodynamics and Fluid Mechanics (CZ)

Mária Čarnogurská, prof. Ing., CSc.

Journal of TECHNIC (CZ)

Mária Čarnogurská, prof. Ing., CSc.

PUBLICATIONS

Books

- [1] JASMINSKÁ, N.: **Mesurement of Energy Flows and CO2 Emissions Balance of the Low - Potential Heat Source in Combination with a Cogeneration Unit. In: Aspect of Computational Intelligence: Theory and Applications.** Berlín, Springer Verlag, 2012, P. 63 - 84. ISBN 978 - 3 - 642 - 30667 - 9.
- [2] TKÁČOVÁ, M. - HUDÁK, R. - ŽIVČÁK, J. - ČEKANOVÁ, P. - MEDVECKÝ, Š. **Determination of Conditions and Positions for Obtaining Thermographic Atlas. 2012. In: Aspects of Computational Intelligence: Theory and Applications.** Germany: Springer, 2012 p. 375 - 391. ISBN 978 - 3 - 642 - 30667 - 9.
- [3] Благодарный, В. М. - Кочурко, В. И. - Андрейчак, И. - Горбай, П.: **Биотопливо и его использование, Барановчи:** Рио - баргч, 2012, 316 s. ISBN 978 - 985 - 498 - 473 - 5.

Textbooks

- [1] BRESTOVIČ, T. - ČARNOGURSKÁ, M.: **Zdroje a premeny energie** 1. vyd. Košice: TU, 2012. 116 s. ISBN 978 - 80 - 553 - 1013 - 8.
- [2] BRESTOVIČ, T. - ČARNOGURSKÁ, M.: **Energy Sources and conversion.** TU v Košiciach, 2012 p.100. ISBN 978 - 80 - 553 - 1316 - 0.
- [3] ČARNOGURSKÁ, M., - BRESTOVIČ, T.: **Vodné hospodárstvo v energetike.** 1. Vyd. Košice: TU, 2012. 100 s. ISBN 978 - 80 - 553 - 1005 - 3.
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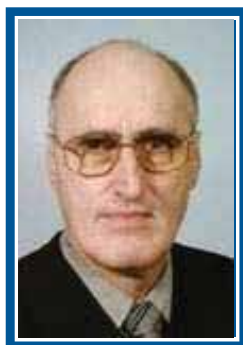
DEAN'S OFFICE OF THE FACULTY OF MECHANICAL ENGINEERING

- Computer and Editorial Centre





Computer and Editorial Centre



Contact

The head: Kamil Madáč,
doc. Ing., CSc.
E - mail: kamil.madac@tuke.sk
Address: Letná 9, 042 00
Košice, SR
Phone no.: +421 55 602 2158



Staff

- Assoc. Professors: 1
- Senior Lecturers: 3
- Research Fellows: 0
- Secretary: 2
- PhD. Students: 1

Activities at the department

Date	Title of the event, activity characterizing the life at the department in 2012
2/2012	ARTEP 2012: Automatization and management theory and practice

LIST OF SUBJECTS GUARANTEED BY THE DEPARTMENT

- ✓ Basic of Information and Computer Systems
- ✓ Basic Informatics
- ✓ CA Methods in Mechanical Design
- ✓ CA Methods in Mechanical Design I.
- ✓ CA Methods in Mechanical Design II.
- ✓ CA Methods in Mechanical Design III.
- ✓ CAD
- ✓ CAD Methods in Mechanical Design
- ✓ CAD - Introduction to Solid Modeling
- ✓ CAD - Introduction to Surface Modeling
- ✓ Computer Aided Design
- ✓ Concepts of Information and Computing Systems
- ✓ Informatics and PC I.
- ✓ Informatics and PC II.
- ✓ Information Systems in Maintenance
- ✓ Information Technology
- ✓ Introduction to Computer Technology
- ✓ Introduction to PC Hardware
- ✓ Introduction to PC Software
- ✓ Introduction to Programming Languages and Tools
- ✓ Maintenance Information Systems
- ✓ Modeling and Simulation of Systems
- ✓ Processes Design by CAD

GRADUATE THESES

PhD. THESES:

Durkáč Viktor

Conceptualization of an artificial cognition to implementation of a cognitive system, using cognitive computing technologies and their validation by the simulation

RESEARCH AT THE DEPARTMENT

Area of research:

- ✓ CAD systems
- ✓ CNC Machining
- ✓ CA TEchnologies
- ✓ IT Technologies

Research characteristics:

The main fields of research of the Computer Centre is optimizing of machining of complex shape surfaces and development of application for CAD systems focused on mechanical problems.

Area of expertises:

- ✓ Computer Hardware
- ✓ Computer Software
- ✓ Server Administration
- ✓ Wifi Administration
- ✓ CA - Technologies

VISITS OF STAFF MEMBERS TO FOREIGN INSTITUTIONS

Employees and students

Durkáč Viktor, Ing.

Country

Škoda Auto Mladá Boleslav, CZ

PUBLICATIONS

Books

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