REPUBLIC OF MACEDONIA

„Ss. CYRIL AND METHODIUS“ UNIVERSITY IN SKOPJE

FACULTY OF MECHANICAL ENGENEERING - SKOPJE

AN ELABORATE

FOR ACCREDITATION OF STUDY PROGRAM,
SECOND CYCLE OF UNIVERSITY ACADEMIC STUDIES
(ONE-YEAR STUDIES)

STUDY PROGRAM

„VIRTUAL MANUFACTURING ENGINEERING“

„ВИРУЕЛНО ПРОИЗВОДНО ИНЖЕНЕРСТВО“

NOMINATING INSTITUTION

„Ss. CYRIL AND METHODIUS“ UNIVERSITY IN SKOPJE FACULTY OF MECHANICAL ENGINEERING - SKOPJE

SKOPJE, DECEMBER, 2018

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Proposed by: Faculty's Board **Adopted by: Educational-scientific Council**

REFERENCED LEGAL PROVISIONS

The Accreditation Elaborate for Virtual manufacturing engineering study programme of second cycle was developed pursuant to the provisions of:

- the Law on Higher Education („Official Gazette of Republic of Macedonia“ No. 82/2018),
- the Rulebook on the Organisation, Operation, Manner of Decision Making, Methodology for Accreditation and Evaluation, Standards for Accreditation and Evaluation and other issues related to the work of the Board for Accreditation of Higher Education („Official Gazette of Republic of Macedonia“ No. 151/2012),
- the Decree on the Norms and Standards for Establishing Higher Education Institutions and Performing Higher Education Activities („Official Gazette of Republic of Macedonia“ No. 103/2010 and 168/2010, Appendix 1 – Classification of Scientific and Research Fields in Accordance with the Frascati Classification),
- the Law on the National Qualifications Framework („Official Gazette of Republic of Macedonia“ No. 137/2013 and 30/2016),
- the Decree on the National Framework for Higher Education Qualifications („Official Gazette of Republic of Macedonia“ No. 154/2010),
- the Rulebook on the Requirements, Criteria, and Regulations for Enrolment and Studying at the First and Second Cycle of University Studies („University Herald“ No. 254/2013),
- the Rulebook on the Mandatory Components of the Study Programmes of the First, Second, and Third Cycle („Official Gazette of Republic of Macedonia“ No. 25/2011 and 154/2011),
- the Rulebook on the Content and the Form of the Diploma, Guidelines for Preparation of the Diploma Supplement and Other Public Documents („Official Gazette of Republic of Macedonia“ No. 102/2018).

Additional document consulted:

- Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG), (2015). Brussels, Belgium.
- General Criteria for the Accreditation of Degree Programmes, ASIIN e.V.- Accreditation Agency for Degree Programmes in Engineering, Informatics/Computer Science, the Natural Sciences and Mathematics, 2015.
- Subject Specific Criteria for the Accreditation of Degree Programmes for Mechanical Engineering and Process Engineering, ASIIN e.V.- Accreditation Agency for Degree Programmes in Engineering, Informatics/Computer Science, the Natural Sciences and Mathematics, 2011.
- Assessment of Higher Education Learning Outcomes (AHELO), Organisation for Economic Co-operation and Development (OECD), 2009.
- International Standard Classification of Education: Fields of Education and Training 2013 (UNESCO).

1. HIGHER EDUCATION INSTITUTION MAP

Name of the high education institution	„Ss. Cyril and Methodius“ University in Skopje Faculty of Mechanical Engineering - Skopje
Address	Rugjer Boshkovic 18, P.O.Box 464, 1000 Skopje
Web page	http://www.mf.edu.mk/
Type of the high education institution (public, private-public non-profit, private non-profit, private profit)	University / Faculty
Data for the founder (private higher education institution)	National assembly of Republic of Macedonia
Data for the last accreditation	First cycle – year 2016, decision no. 14-1177 from 17.07.2017 Second cycle – year 2008, 2011, 2012, 2014 Third cycle – year 2018
Study and research areas for which accreditation has been obtained	Research fields: Machinery, Energy, Production Engineering, Industrial Engineering and Management, Quality Control, Materials, Environment, Transport, Transportation, Construction and Water Management, Regulation and management of technological processes Scientific research area: Technical and Technological Sciences
Faculty in the higher education institution	**Faculty at „Ss. Cyril and Methodius“ University in Skopje 28 members (23 faculties and 5 institutes).** **Faculty of Mechanical Engineering consists of 6 institutes and 1 department.**
Study programs that are realized in the unit who requires extension of the activity by introducing new study program	**First cycle:** **a) Four years academic study programs (240 ECTS):** Production Engineering Transport, Mechanization and Logistics Thermal Engineering Hydraulic Engineering and Water Management Materials, processes and inovations Industrial Engineering and Management Motor Vehicles Energy and environment Mechatronics Automation and Control Systems Industrial design **Second cycle:** **a) Study program for one year Master studies:** • Production Engineering • Transport and Logistics Thermal Engineering • Automatics and fluids engineering • Materials and Welding • Industrial Engineering and Management • Motor Vehicles

<table>
<tr><td></td><td>

Sustainable energy and environment
Mechatronics
Product lifecycle management
Management and Quality Control

b) Name of the study program for two year Master studies:

Industrial design and marketing
Management of occupational health and safety systems
Management and Quality Control

Third cycle:

Study program in Machinery
Study program Industrial engineering and management

</td></tr>
<tr><td>Data for international cooperation in the field of teaching, research and student mobility</td><td>The Faculty of Mechanical Engineering has international cooperation in the field of teaching, research and student mobility within the CEEPUS mobility program of teaching and student staff, Erasmus and Erasmus + program (signed several agreements with foreign universities, information available at http: //www.ukim.edu.mk/dokumenti_m/431_Erazmus+%20dogovori.doc) and other agreements on international cooperation.</td></tr>
<tr><td>Information about area for teaching and research</td><td>
1. Total area (gross area) (space for teaching and yard) 9918 m^2
2. Total teaching area (net space) 4840 m^2
3. Number of lecture theaters with total number of chairs lecture theaters with total number of chairs 480
4. Number of classrooms with total number of chairs 24 classrooms with total number of chairs 1111
<table>
<tr><th>no.</th><th>Types of didactic space numeration</th><th>Number of premises</th><th>Area in square metres</th><th>Total seating capacity</th></tr>
<tr><td>1.</td><td>Lecture theaters</td><td>2</td><td>426</td><td>480</td></tr>
<tr><td></td><td>AMF</td><td>1</td><td>228</td><td>300</td></tr>
<tr><td></td><td>225</td><td>1</td><td>198</td><td>180</td></tr>
<tr><td>2.</td><td>Classrooms</td><td>25</td><td>1628,8</td><td>1113</td></tr>
<tr><td></td><td>123</td><td>1</td><td>87</td><td>56</td></tr>
<tr><td></td><td>124</td><td>1</td><td>87</td><td>64</td></tr>
<tr><td></td><td>125</td><td>1</td><td>75</td><td>40</td></tr>
<tr><td></td><td>224</td><td>1</td><td>111</td><td>80</td></tr>
<tr><td></td><td>310</td><td>1</td><td>127</td><td>88</td></tr>
<tr><td></td><td>311</td><td>1</td><td>76</td><td>48</td></tr>
<tr><td></td><td>A1-1</td><td>1</td><td>88</td><td>88</td></tr>
<tr><td></td><td>A1-2 left</td><td>1</td><td>38</td><td>38</td></tr>
<tr><td></td><td>A1-2 right</td><td>1</td><td>43</td><td>28</td></tr>
<tr><td></td><td>A1-3</td><td>1</td><td>43</td><td>28</td></tr>
<tr><td></td><td>A1-5</td><td>1</td><td>43</td><td>28</td></tr>
<tr><td></td><td>F1-2</td><td>1</td><td>54,5</td><td>22</td></tr>
<tr><td></td><td>F2-4</td><td>1</td><td>60,4</td><td>32</td></tr>
<tr><td></td><td>F2-5</td><td>1</td><td>42,3</td><td>18</td></tr>
<tr><td></td><td>F2-6</td><td>1</td><td>53,3</td><td>22</td></tr>
</table>
</td></tr>
</table>

	К2-6	1	44,7	28
	К2-7	1	44,7	25
	К2-15	1	44,7	20
	К3-9	1	80	40
	К3-1	1	55,1	36
	К3-18	1	55,1	36

Information about the equipment for teaching and research

1. Number of classrooms with computer and capacity of computer workplaces

10 classrooms with total 274 workplaces

no.	Types of didactic space numeration	Number of premises	Area in square metres	Total seating capacity
1	**Computer rooms**	**10**	**391**	**274**
	Room 309	1	75	25
	Room 312 Web Lab	1	75	25
	Computer center 1	1	79	30
	Computer center 2	1	84	44
	Room К1-2	1	47,4	24
	Room К1-3	1	47,4	24
	Room К2-8	1	48,3	40
	Room К3-18 Idea.lab	1	44,7	12
	Room F1-1	1	35	22
	Room A1-4	1	43	28

2. Number of laboratories for practical teaching …… **21**

3. Equipment for performing higher education activities
Equipment value ..... **13.829.470,00 MKD**

Number of students that a accreditation is obtained for

Number of students **1413**

Number of students (enrolled for the first time)

Number of regular students on postgraduate studies **310**

Number of staff in teaching and research, scientific and teaching positions

Structure of the teaching staff in teaching science, research, teaching and associate titles

Full professor	37
Associate professor	10
Assistant professor	13

Number of staff with assistant positions	Structure of associates after teaching science, research, teaching and associate titles Teaching Assistant 10 Research assistant 1
Teacher: students ratio (number of students per teacher) for each unit separately	1413 / 60 = 23.55
	(http://www.mf.edu.mk/sites/default/files/files/IZVESHTAJ%20za%20samoevaluacija%20na%20MFS%202013.pdf)
Frequency of self-evaluation process (every year, two years, three years)	In order to provide conditions for continuous improvement of the quality of teaching (educational process) it is provided a self-evaluation in every three years.
Data of last conducted external evaluation of the institution	Report for the subsequent evaluation of Ss Cyril and Methodius University in Skopje issued by the European University Association, 2015: http://www.ukim.edu.mk/dokumenti_m/EUA_Izvestaj-lektoriran.pdf
Other information that the institution wants to specify as an argument for its success	
Internal mechanisms that ensure quality control for the studies	• Development of teaching contents • Completion of the teaching process • Evaluation of students • Graduation paper, • Rating the quality of teaching by students with surveys at the end of each semester for each subject, • Evaluate the quality of the study program by the students in the award of the diploma and • Other procedures relating to resources and logistics of the teaching process.

1a. General classification descriptors for one-year university studies of second cycle comprising 60 ECTS, organised by the Faculty of Mechanical Engineering – Skopje, pursuant to the Decree on the National Framework for Higher Education Qualifications.

Level in the National Framework for Higher Education Qualifications	Higher Education	Level in the European Framework for Higher Education Qualifications
VIIA	Second cycle of university, academic Master studies, one-year studies, 60 ECTS	7

Knowledge and understanding	Demonstrates knowledge and understanding in the scientific and research fields of mechanical engineering, power engineering, industrial engineering and management, quality control, materials, environment, traffic and transport, civil and water management, regulation and management of technological processes, organisational sciences and management, which build upon the previous education and training acquired in the first cycle of studies, including knowledge in the domain of theoretical, practical, conceptual, comparative, and critical perspectives in the scientific fields and areas using appropriate methodology. Demonstrates understanding of the relevant fields that are subject of the study of the second cycle and knowledge of the current issues related to the scientific research and new sources of knowledge.
Applying knowledge and understanding	Is able to apply the acquired knowledge and understanding to the field of the subject of the study programmes demonstrating an in-depth, professional, and competent approach to solving tasks at work or in the profession. Demonstrates competencies for identification, analysis, and problem solving in the scientific subject areas from the second cycle of studies. Is capable of finding and supporting arguments within the study field of the second cycle of studies.
Making judgments	Possesses the ability to collect, analyse, evaluate, and present information, ideas, and concepts in the frames of the conducted scientific and research activities, using relevant data. Is able to make appropriate assessments taking into account personal, social, scientific and research, developmental, and ethical aspects. Is able to evaluate theoretical and practical issues, to formulate opinion and provide explanation of the causes that give rise to certain phenomena and to choose an appropriate solution.
Communication skills	Is able to establish contacts, develop arguments and discuss with both specialist and non-specialist audience on issues and about information, ideas, problems, tasks, and solutions when the criteria for decision making and the scope of the task are clearly defined. Takes over a divided, separate responsibility for issues arising from teamwork and related to collective results. Is capable to participate independently in specific, scientific, and interdisciplinary discussions while demonstrating a professional and comprehensive approach.
Learning skills	Takes initiative to identify the needs for acquiring further knowledge and learning with a high degree of autonomy.

1b. Specific qualification descriptors determining the learning outcomes for second cycle one-year university academic studies comprising 60 ECTS, Virtual manufacturing engineering study programme, pursuant to the Decree on the National Framework for Higher Education Qualifications

Knowledge and understanding	Shows the thorough knowledge and understanding in scientific research fields and areas acquired in the second cycle and relate to: • Knowledge of modern working processes and constructive solutions; • Abilities in simulation of complex automotive mechanical systems; • Knowledge of computer based engineering (CAD, CAE, CAM, CAT – design, computation, manufacturing and testing); • Assimilation of the calculation methods needed for manufacturing processes, product design or efficient use; • Ability to conceive, design and simulate manufacturing, mechanical and mechatronic system using modern methods (multibody, finite element, virtual reality); • Knowledge and using smart technologies and virtual engineering for modeling and simulation of manufacturing systems and processes; • Knowledge and practical training regarding virtual reality and/or augmented reality, manufacturing and mechatronic system of machines; • Technology and state of the art techniques for concurrent engineering;
Applying knowledge and understanding	Is capable of studying tasks that are subject to analysis as a complex, demonstrating elements of discernment, and can apply the knowledge and understanding in a manner indicating a professional approach to the job or the profession. Demonstrates competencies for identification, analysis, and problem solving in the relevant scientific areas studied in the second cycle of studies. Is capable of finding and supporting arguments within the field and areas of study.
Making judgments	Possesses the ability to collect, analyse, evaluate, and present information, ideas, and concepts using relevant data. Makes appropriate assessments taking into account personal, social, scientific and ethical aspects. Is able to evaluate theoretical and practical issues from the area of Virtual manufacturing engineering, to provide well-supported explanations of the causes of certain phenomena, to explain the laws behind them, and to choose an appropriate solution.
Communication skills	Develops the ability to establish communication and to discuss with both specialist and non-specialist audience about information, ideas, problems, and solutions when the decision criteria and the scope of the task are clearly defined. Takes a divided, separate responsibility for collective results. Is capable to participate independently, taking a professional approach, in specific, scientific, and interdisciplinary discussions.
Learning skills	Undertakes initiative to identify the needs for acquiring further knowledge and learning with a high degree of autonomy, i.e. the student evaluates the need for continuous enhancement of their knowledge and skills.

2. Decision on adopting the study programmes by the Scientific and Educational Council of the Faculty (Faculty of Mechanical Engineering - Skopje), the Educational Council of the autonomous higher vocational school or the Scientific Council of the scientific institution.

The Decision is enclosed as Appendix 1 near at the end of the Elaborate.

3. Decision on adopting the study programme by the Rector's Board, the University Senate, or the Council of the scientific Institution

The Decision is attached as Appendix 2 near the end of the Elaborate.

4. Scientific and research area, field and domain of the study programme

Study programme: Virtual manufacturing engineering

Scientific and research area	2 Technical and technological sciences
Scientific and research field	214 Mechanical Engineering
Scientific and research branch	21403- Production engineering, technologies and systems Areas of these scientific research fields studied in this course programs according to the study program, as well as areas that correspond to the course programs studied in the study program, and belong in research fields that are not listed.

5. Type of study programme (academic or vocational studies)

Virtual manufacturing engineering study programme, organised by the Faculty of Mechanical Engineering - Skopje is an academic university study programme.

6. Degree of education (first or second cycle)

Virtual manufacturing engineering study programme at the Faculty of Mechanical Engineering - Skopje is an academic university study programme of second cycle, organised as a year-long programme comprising 60 ECTS.

7. Objectives and rationale for the Virtual manufacturing engineering study programme

The Faculty of Mechanical Engineering – Skopje at „Ss. Cyril and Methodius" University in Skopje is the leading institution in educating mechanical engineers in this country. In order to satisfy the requirements deriving from foreign investors, but also from domestic manufacturing companies, it is needed constantly educating personnel who have new interdisciplinary knowledge, and successfully responding to global trends. The Institute of Production Engineering and Management at faculty of Mechanical Engineering in Skopje, suggests study program which results from the previously derived comprehensive analysis and identification of needs and employment opportunities for university graduates in: advanced technologies, concurrent engineering, smart technologies used at modern companies for production engineering, tool and mold design, concurrent engineering. Recognizing the basic profile competencies and acquired qualifications in production engineering this study program justifies expectations for analysis, exploration, state of the art technologies for modeling and simulation of the manufacturing processes and design of product development and process, design & manufacturing of tool and mold in virtual environment, modeling and simulation for detecting and definition of working conditions; advanced 3D digitalization, 3D printing technologies, additive manufacturing.

Another very important fact of such a study program in English are the provisions of the Law for Higher education which stipulates the minimum necessary study programs at higher education institution. The above reasons are showing the basic elements of social viability and the benefit of this study program and its sustainability in the future.

The abovementioned reasons give rise to the basic elements of the social justification and benefits from this study programme, as well as its sustainability in the future.

8. Duration of the study programme expressed in years and semesters

The **Virtual manufacturing engineering** study programme is implemented in one year, two semesters, in accordance with the 4+1 model.

9. ECTS credits obtained by the student

By completion of one-year long university studies of second cycle in **Virtual manufacturing engineering** study programme organised by the Faculty of Mechanical Engineering – Skopje, the student acquires 60 ECTS credits.

10. Manner of financing, and for private higher education and scientific institutions also a proof of secured a quality financial guarantee for the study programme

The expenses for conducting the graduate studies in **Virtual manufacturing engineering** study programme will be covered by the students in the form of self-financing or co-financing. The sum, the manner of payment, as well as all the other requirements are regulated by the Rulebook on the Requirements, Criteria, and Regulations for Enrolment and Studying at the First and Second Cycle of University Studies of the Ss. Cyril and Methodius University in Skopje. In case of future participation in financing by the State, the amount of participation shall be taken into account in defining the amount for co-financing.

11. Enrollment requirements

The right to be enrolled in this study program belongs to candidates with completed university academic studies with acquired 240 ECTS, or candidates with completed undergraduate studies pursuant to the Law on Higher Education in force prior to implementation of ECTS system pursuant to the Bologna Declaration.

Enrollment of students in all the study programmes of the studies of second cycle shall be done pursuant to the provisions of the 'Call for Enrollment of Students at Studies of Second Cycle at the Ss. Cyril and Methodius University in Skopje'.

The Educational and Scientific Committee of the study programme shall be deciding on the fulfillment of the criteria of relatedness of the previous education with the study programme.

12. Information on continuation of education

After completing university studies of second cycle, **Virtual manufacturing engineering** study programme at the Faculty of Mechanical Engineering – Skopje, the students can continue their education at third cycle of studies.

13. Determined ratio between compulsory and elective courses with a list of compulsory courses,

list of elective courses, and defined manner of choosing courses

Virtual manufacturing engineering study programme of university academic studies of second cycle is organised as full-time one-year (two semesters) studies.

The study programme represents a continuation – enhancement of knowledge acquired in the first cycle of university academic studies of 4-year duration.

These one-year university studies of second cycle encompass a certain number of subject programmes (courses) which are expressed in a number of credits defined in the course programmes.

The structure of the **Virtual manufacturing engineering** study programme, one-year academic university studies of second cycle, is presented in Table 1, and the ratio between the compulsory and elective courses are presented in Table 2.

Table 1.

No.	Teaching Course Programs (Teaching Subjects)	ECTS	Winter semester	Summer semester
1.	Compulsory Teaching Courses 1 (Table 1)	**6**	**6**	
2.	Compulsory Teaching Courses 2 (Table 1)	**6**	**6**	
3.	Compulsory Teaching Courses 3 (Table 1)	**6**	**6**	
4.	Compulsory Teaching Courses 4 (Table 1)	**6**	**6**	
5.	Elective Teaching Courses 1 (Table 2 or from University list)	**6**	**6**	
6.	Elective Teaching Courses 2 (Table 2)	**6**	**6**	
7.	Elective Teaching Courses 3 (Table 2)			
	Master thesis	**18**		**18**
Total credits per semester:			**30**	**30**
Total credits:		**60 ECTS**		

Table 2. List of Compulsory Teaching Courses

No.	Course programs (subjects) – Winter Semester IX	ECTS
1.	Virtual Manufacturing	**6**
2.	Flexible Automation	**6**
3.	Technology of Rapid Prototyping	**6**
4.	Intelligent Processes and Smart Technologies	**6**

Table 3. List of Elective Teaching Courses (select one course for winter semestar and two courses for summer semestar)

No.	Course programs (subjects) - Winter and Summer Semester IX and X	ECTS
1.	3D Digitalization Processes in Manufacturing	**6**
2.	Augmented Reality	**6**
3.	Numerical Control Machines and CNC Programming	**6**
4.	Computer Integrated Manufacturing	**6**
5.	Modeling and Simulation of Plastic Deformation Technologies and Tools	**6**
6.	Virtual Design of Production Systems and Machines	**6**
7.	Ergonomic Systems	**6**
8.	Selected Topics in Mathematics and Informatics	**6**
9.	Database Systems	**6**

10.	Business Information Systems	**6**
11.	TQM	**6**
12.	Product Data Engineering	**6**

Table 4. Master Thesis

No.	Course programs (subjects) - Summer Semester X	ECTS
1.	Master Thesis	**18**

Regarding the elective courses, the student is allowed to choose courses offered by other accredited university studies which are 6 ECTS worth.

Students are allowed to attend and take examination for up to two courses offered by one same professor.

Pursuant to the Law on Higher Education, the programme is delivered in Macedonian language. However, compliant to the provision of Article 139 Paragraph 10 of the Law on Higher Education certain courses can be delivered in English.

14. Information on the premises foreseen for realization of the study programme

The graduate studies are organised as full-time studies with instruction.

The Faculty of Mechanical Engineering has on disposal sufficient special capacity for realisation of the educational process on the first, second, and third cycle of studies, noted in the Higher Education Institution Map.

The course programs envisages clinical teaching as well as recommended in the legislation, which is carried out in the workplace, the economy or the faculty by hiring prominent experts from practice.

15. List of equipment foreseen for implementation of the study programme

The Faculty of Mechanical Engineering – Skopje has got the following pieces of equipment at its disposal for instruction:

- Hydraulic system for measurements of small turbine;
- System for laboratory tests of fluidized bed combustion (defining the flow and the temperature in the combustion of solid fuels in fluidized bed);
- System for testing turbopumps, model turbines, and pipeline armature (the system is composed of three-chamber reservoir, electric motor driven pump, vacuum pump, compressor, compressed air reservoir);
- Machines from the field of pneumatics, electro-pneumatics, hydraulics, electro-hydraulics, proportional hydraulics and application of computers in programmable memory control;
- Measuring Amplifier instrument for dynamical measurements HBM KWS/6A-5;
- Measuring Amplifier instrument for dynamical measurements HBM type KWS 673.D4. ;
- Multi-channel measurement instrument HBM type 3835A (6 x UM3301A);
- Instrumentation Data Acquisition Tape Recorder HP 3964A and HP 3968A;
- Two-channel Oscilloscope HBM type H2B.13A;
- Spectrum Analyzer HP 3582A;
- Six-channel electronic writer RIKADENKI type R65 with RS232 interface;

- Two-coordinate electronic writer HP type 7015B;
- Set for application of measure gauges HBM- DAK2;
- Measuring amplifier for no contact measure of torque HBM-BLM;
- Five-channel measure amplifier- acquisition system DMC- SHARP;
- PC computer with built-in A/D (D/A) cards NATIONAL INSTRUMENTS type AT -MIO-16;
- Interfaces for online signal processing and equipment control;
- XS Plotter ROLLAND- DXS.880;
- Six-channel measuring amplifier instrument for static and quasi static measurements HBM-UPM60;
- Junction box HBM-BT21 93;
- Strain gauges for tensometric testing (HBM и PHILIPS) of different types;
- Inductive transducers for displacement HBM type W20 (1), W50 (2) and W100 (4);
- Inductive transducer for acceleration HBM type B12 (8);
- Transmission system transducer - registering pressure force;
- Fluid pressure transducer HBM type P11/10; P1/200;
- Force transducers HBM type 36X2/1t, 312/50 и 312/200;
- Press for inflicting force MF1;
- Transducers (of different types) for temperature measurement;
- Tensometric transducers for measuring torque;
- Collector rings and brushes HBM;
- Device for measuring the thickness of metal walls (metal sheets);
- Apparatuses and systems for determining physical and chemical characteristics of fuels, lubricantion olis, and water;
- Device for examination of surface cracks;
- Equipment for dimensional measurement, control of length and angular characteristics, quality of surface, mass and other controls;
- Devices for examination of harmful substances in exhaust gasses;
- Etalon gasses for comparison and control of gas analyzers;
- Tachometer (RPM gauge) ISKRA;
- Weighing scales with weight range 50 to 10,000 kg.;
- Aggregate HONDA 800 for charging the measure instruments when dynamic testing of vehicles are performed;
- Computers (DIGITAL, XP, PC), used as servers, graphics and autonomous workstations;
- Instruments and devices for vibration measurements (vibration analyser, vibrometer, calibration vibrator etc.)
- Devices for measurement of noise (noise analyser, filter, microphones and other aids)
- Testing stands for protective equipment and shelters (shock wave simulators, flow rate measurements with micromanometers);
- Device for measuring relative humidity and speed;
- Chamber for air conditioning on a certain temperature and relative humidity;
- Chamber of examination and testing of thermal devices;
- Instruments for measuring heat;
- Instructional cooling aggregate “Graco” with measurement and regulation devices for thermoenergetic balancing

- Cooling calorimetric aggregates as teaching resourse and for balancing;
- Forced draught cooling tower with water system, lamellate heat exchanger for water cooling for the air conditioning chamber and thermal testing;
- Heat pump model plant;
- "Vaporax" steam boiler for fast steam production and burners;
- Device for chemical preparation of water, supply reservoir, etc.;
- Instruments for exhaust gases analysis;
- Motor octane number determining (IT9-2M) using the motor method;
- Professional Software ADAMS, CAD, FLUENT, LAB WINDOWS Ideas, Nisa, Algor, Delphi, Matlab, CATIA, SOLID, SIEMENS (NX, Technomatix, Teamcenter, …), Solidworks, Autodesk Inventor, ArtCAM, X3 Medical V6, RapidWorks and other;
- Hand-held devices for water quality measuring Eureka Environmental Manta Multiprobe Logger3.0, Cond Graphite, 4 electrode, Amphibian Display Package;
- Ultrasonic flowmeter EESIFLO PORTALOK 7S;
- Hiperspectral process photometer spectro::lyser:
- Data acquisition system con::stat - industrial process control terminal (900/1800 MHz GSM);
- Laboratory measuring equipment Laboratory Conductivity Meter, Laboratory Oxygen Meter;
- Set for soil testing;
- GPS – Global Positioning Unit, One Frequency R3 GPS system (base+rover) with post–processing software Trimble Recon ;
- Zeta-Meter System 3.0+ with Unitron FSB 4X Microscope;
- M-CAM 40 - CNC wood processing machine;
- XSensors - pressure mapping system;
- NextEngine - 3D Scanner;
- Styrocut thermo cutter.

• Control block, Mitutoyo, type: 515 - 500 , No. 009400	Measuring range: 0 - 300 mm, Accuracy: 2.5 µm
• Control block, Mitutoyo, type: 515 - 742, No. 022036	Measuring range: 0 - 600 mm, Accuracy: 3.5 µm
• Control ring Ø 10 mm, Mitutoyo, Tip: 177 - 126, No. 881078	Nominal diameter: 10 mm, Cylindricity: 1 µm,
• Control ring Ø 14 mm, Einst, Kp-01	Nominal diameter: 14 mm, Cylindricity: 1 µm
• Control stick L= 25 mm, Mitutoyo, No. 167 - 101	Nominal length: 25 mm, Tolerance: (1+L/50), L in mm
• Control stick L= 50 mm, Mitutoyo, No.167 - 102	Nominal length: 50 mm, Tolerance: (1+L/50), L in mm
• Control stick L= 75 mm, Mitutoyo, No. 167 - 103	Nominal length: 75 mm, Tolerance: (1+L/50), L in mm
• Control stick L = 100 mm, Mitutoyo, No. 167 - 104	Nominal length: 100 mm, Tolerance: (1+L/50), L in mm
• Control stick L =125 mm, Mitutoyo, No.167 - 105	Nominal length: 125 mm, Tolerance: (1+L/50), L in mm
• Control stick L = 150 mm, Mitutoyo, No. 167 - 106	Nominal length: 150 mm, Tolerance: (1+L/50), L in mm
• Control ring Ø 50 mm, Einst, Kp-02	Nominal diameter: 50 mm, Cylindricity: 1 µm,

• Control glass for flatness testing 12 mm, Mitutoyo, No. 157 – 101	Thickness: 12 mm Flatness: 0.1 μm Parallelism: 0.2 μm
• Set of plane-parallel control glasses for inspection of parallelism (4 pieces) Mitutoyo, No. 157 - 903	Thickness: 12,00; 12,12; 12,25; 12,37, Flatness: 0.1 μm Parallelism: 0.2 μm
• Set of plane-parallel bordering scales (10 pieces), Mitutoyo, Code No: 516 - 107, Serial No. 219652	Measuring range: 2,5-25,0 mm, Class I (in accordance with DIN 863)
• Universal length measuring machine, Carl Zeiss Jena, No. 2492	Measuring range: to 600 mm, Resolution: 1 μm
• Universal length measuring machine, Carl Zeiss Jena, No. 1591	Measuring range: to 600 mm, Resolution: 1 μm
• Universal length measuring machine, SIP, Type: MUL-300, No. 556	Measuring range: to 300 mm, Resolution: 0.5 μm With possibility of coil profile measuring
• Universal measuring microscope, Carl Zeiss Jena, No. 10344	Measuring range: 25 x 25 (50 x 150) mm Resolution: 0.01 mm
• Universal measuring microscope, UIM-21, No. 610978	Measuring range:: 100 x 250 mm Resolution: 0.01 mm
• Granite measuring plate, Hommel - dura, No. 11043	Dimensions: 1000x630x150 mm, Accuracy class: 1

16. Course programmes, including information related to Article 4 of the Rulebook on the Mandatory Components of the Study Programmes of the First, Second, and Third Cycle ("Official Gazette of the Republic of Macedonia" No. 25/2011) and the Rulebook on Changes and Amendments of the Rulebook on the Mandatory Components of the Study Programmes of the First, Second, and Third Cycle ("Official Gazette of the Republic of Macedonia" No. 154/2011)

Add. 3	**Course program for the second level (second cycle - postgraduate) of studies**				
1.	Course title	Virtual Manufacturing			
2.	Code	2VME01			
3.	Study group(s)	Virtual Manufacturing Engineering (VME)			
4.	The organizer of the study program (unit, institute, department)	„Ss. Cyril and Methodius" University in Skopje, Faculty of Mechanical Engineering – Skopje Institute of Production Engineering and Management			
5.	Level (first, second, third degree)	Second degree			
6.	Academic year / semester	I/winter	7.	ECTS credits	6
8.	Professor	Prof. Dr. Sc. Gligorche Vrtanoski			
9.	Prerequisites for enrolling the course	None Completed undergraduate studies			
10.	Course objectives (competences): This course will contribute to getting acquainted with the techniques of visual communication of computer design and advanced elements of virtual production. Advanced 3D geometric modeling in the direction of making simulation virtual models and computer animation. Virtual techniques for evaluating products and production processes in virtual production.				
11.	Course content: Introduction to virtual manufacturing as a tool for improving the design and production				

	engineering. 3D graphics and concepts of virtual reality and virtual production. Definition, application of VM technology in product design, manufacturing processes, operation management, relationships in the key domains of applying VM in virtual production. 3D advanced modeling using special geometric modeling techniques. Graphic visualization of models, level detail management - LOD, principles of visual perception, choice of lighting, color, illumination and shading. Collaborative design in creating models for conceptualizing the idea of computer animation. Graphic Virtual scenario by choosing the appropriate tools and techniques. Composition and installation of computer simulation and animation. Simulation of the behavior of systems, products in the manufacturing process and manufacture parts with CNC machines. Documentation management in a virtual production environment through Internet WEB technology. Simulation of the layout of machines in the factory by analyzing and evaluating the appearance of virtual production.				
12.	Study methods: Interactive lectures, auditory and/or laboratory practice, self running and/or team work on project assignments, self running assignments				
13.	Total hours		6 ECTS x 30 = 180 hours		
14.	Hours allocation per activity:		30+20+80+20+30=180 hours		
15.	Lectures/Lab	15.1.	Lectures (15 weeks x 2)		30 hours
		15.2.	Lab (student work)		20 hours
16.	Project Work/Assignments	16.1.	Project assignments		80 hours
		16.2.	Individual assignments		20 hours
		16.3.	Self-study		30 hours
17.	Points/Marks:				
	17.1.	Exams			30 %
	17.2.	Projects			60 %
	17.3.	Attendance			10 %
18.	Grading scale		under 50 %		5 (five) (F)
			51-64 %		6 (six) (D)
			65-74 %		7 (seven) (C)
			75-84 %		8 (eight) (B-)
			85-94 %		9 (nine) (A-/B+)
			95-100 %		10 (ten) (A/A+)
19.	Prerequisites for taking the final exam		Seminar works delivered and approved		
20.	Language		English, Macedonian		
21.	Course evaluation		Student questionnaire and other methods for continual self evaluation		

22. Textbooks

22.1 Instruction materials

No.	Author	Title	Publisher	Year
1.	Gligorche Vrtanoski	Unauthorized lectures of Virtual Manufacturing	Faculty of Mechanical Engineering	2018
2.	Prashant Banerjee and Dan Zetu	Virtual Manufacturing	Wilye	2001
3.	Wasim A. Khan, Abdul Raouf K. Cheng	Virtual Manufacturing	Springer	2011

22.2 Supplemental Instruction Materials

No.	Author	Title	Publisher	Year
1.	Rick Parent and otr.	Computer animation complete	Elsevier	2010
2.	Dariush Derakhshani	Introducing Maya	Sybex	2004

				6: 3D for Beginners		
		3.	Andrew Gahan	3ds Max Modeling for Games	Elsevier	2009

Add. 3	**Course program of the first, second and third level (cycle) of studies**				
1.	Course title	Flexible Automation			
2.	Code	2VME02			
3.	Study group(s)	Advanced manufacturing systems and technologies, Virtual manufacturing engineering			
4.	The organizer of the study program (unit, institute, department)	„Ss. Cyril and Methodius“ University in Skopje, Faculty of Mechanical Engineering – Skopje Institute of Production Engineering and Management			
5.	Level (first,second,third)	Second			
6.	Academic year/semester	I/winter	7.	ECTS credits	6
8.	Professor	Prof. Dr. Zoran Pandilov			
9.	Prerequisites for enrolling the course	None			
10.	Course objectives (competences): Recognizing the elements that build the flexible automation, and analysis for the justification of their application. Introduction to the basic elements of flexible automation (numerical control, robotics, flexible manufacturing systems, programmable logic controllers, CAD/CAM/CAE systems, CIM systems).				
11.	Course content: Application of automation in production. Basic elements of automated systems. Advanced Features in Automation. Levels of Automation. Automation of production systems. Principles and strategies of automation. Economic and social aspects of automation. Fundamentals and concept of control systems. Elements of a system with feedback. Transfer function. Mathematical presentation of transfer functions. System stability. Numerical control (NC). Classification of NC systems. Areas of application of NC. Computer Numerical Control. Direct Numerical Control, Distributive Numerical Control and Adaptive Control. Design features of machines with Numerical Control. Regulated drives for machines with Numerical Control. Numerically Controlled Machines for high speed cutting. Industrial robots. Construction of robots. Robots with serial and parallel kinematics. Types of robots control. Types of robots programming. Areas of application of robots. Discreet process control (logical control and sequencing). Ladder logical diagrams. Application of programmable logic controllers in automation. Flexible Manufacturing Systems (FMS). What is FMS? Components of the FMS. Areas of application of FMS and benefits. Planning and implementation of FMS. CAD, CAM, CAD/CAM systems. Computer Integrated Manufacturing CIM.				
12.	Study methods: Lectures supported by presentations, interactive lectures, auditory and/or laboratory practice, company visits, guest lecturers from industry, self running and/or team work on project assignments, self running assignments				
13.	Total hours	6 ECTS x 30 hours = 180 hours			
14.	Hours allocation per activity:	30+30+30+30+60=180 hours			
15.	Lectures/Exercises	15.1.	Lectures (15 weeks x 2 hours)	30 hours	
		15.2.	Exercises (laboratory,	30 hours	

			auditory), seminars, team work (15 weeks x 2 hours)	
16.	Other forms of activity	16.1.	Project assignments	30 hours
		16.2.	Individual assignments	30 hours
		16.3.	Self-study	60 hours

17.	Points/Marks:		
	17.1.	Partial exams	50 %
	17.2.	Project and individual assignments (presentation: written and oral)	40 %
	17.3.	Activity and participation	10 %

18.	Grading criteria (points / grade)	under 50 %	5 (five) (F)
		51-64 %	6 (six) (D)
		65-74 %	7 (seven) (C)
		75-84 %	8 (eight) (B-)
		85-94 %	9 (nine) (A-/B+)
		95-100 %	10 (ten) (A/A+)
19.	Prerequisites for taking the final exam	Realized activities 16.1, 16.2, 16.3	
20.	Language	English, Macedonian	
21.	Method of monitoring the quality of teaching	Mechanisms of internal evaluation and surveys, students questionnaire	

22. Textbooks

22.1. Instruction materials

No.	Author	Title	Publisher	Year
1.	Zoran Pandilov	Flexible automation- printed lectures		
2.	Mikell P. Groover.	Automation, Production Systems and Computer Integrated Manufacturing, 4th Edition	Pearson, USA	2015
3.	Kurfess, Thomas. R. (Editor)	Robotics and Automation Handbook	CRC Press, Inc., Boca Raton, FL	2005

22.2. Supplemental Instruction Materials

No.	Author	Title	Publisher	Year
1.				
2.				
3.				

Add. 3	**Course program for the second level (second cycle - postgraduate) of studies**					
1.	Course title	Technology of Rapid Prototyping – Aditive Manufacturing				
2.	Code	2VME03				
3.	Study group(s)	Virtual Manufacturing Engineering (VME)				
4.	The organizer of the study program (unit, institute, department)	„Ss. Cyril and Methodius“ University in Skopje, Faculty of Mechanical Engineering – Skopje Institute of Production Engineering and Management				
5.	Level (first, second, third degree)	Second				
6.	Academic year / semester	I/winter	7.	ECTS credits	6	
8.	Professor	Prof. dr Atanas Kochov				
9.	Prerequisites for enrolling the	None				
10.	Course objectives (competences): Objectives of the course are acquiring knowledge about advanced smart specialized systems for developing rapid prototypes, techniques, their application in the processes of development of new products and production systems, application of integrated computer aided systems (CAx) for designing and modeling of products and processes. Concept of Additive manufacturing, rapid prototyping technologies, Smart Prototyping Technologies, Rapid tooling processes, mold design and methodologies for producing rapid tools.					
11.	Course content: • The mechanisms behind all major 3D printing technologies • The benefits and limitations of each technology • Decision making tools for technology selection • Smart prototyping technologies • Expert systems in RP, RT • Actionable design advice and guidelines • Industry case studies from world-leading brands Additionally, the course will cover: Technologies for creating rapid prototypes; techniques: Stereo lithography - SLA; Laminated Object Manufacturing - LOM; Selective Laser Sintering - SLS; Fused Deposition Modeling - FDM; Solid Ground Curing SGC; 3-D Ink-Jet Printing; application of rapid prototype techniques, further development. The benefits of smart technologies of RP, RT in new digital companies for Industry 4.0. Advances in new approaches for 21-st century companies.					
12.	Study methods: Interactive lectures, auditory and/or laboratory practice, self-running and/or team work on project assignments, self-running assignments					
13.	Total hours	6 ECTS x 30 = 180 hours				
14.	Hours allocation per activity:	30+30+30+30+60=180 hours				
15.	Lectures/Lab	15.1.	Lectures (15 weeks x 2)	30 hours		
		15.2.	Lab (student work)	30 hours		
16.	Project Work/Assignments	16.1.	Project assignments	30 hours		
		16.2.	Individual assignments	30 hours		
		16.3.	Self-study	60 hours		
17.	Points/Marks:					
	17.1.	Exams	60 %			
	17.2.	Projects	30 %			
	17.3.	Attendance	10 %			
18.	Grading scale	under 50 %	5 (five) (F)			

					51-64 %	6 (six) (D)
					65-74 %	7 (seven) (C)
					75-84 %	8 (eight) (B-)
					85-94 %	9 (nine) (A-/B+)
					95-100 %	10 (ten) (A/A+)
19.	Prerequisites for taking the final exam				Seminar work delivered and approved	
20.	Language				English	
21.	Course evaluation				Student questionnaire	
22.	Textbooks					
	22.1	Instruction materials				
		No.	Author	Title	Publisher	Year
		1.	Todd Grimm	Rapid Prototyping		2004
		2.	Frank W. Liou	Rapid Prototyping And Engineering Applications: A Toolbox for Prototype	CRC Pr I Llc	2007
		3.	Steven Ashley	"From CAD Art to Rapid Metal Tools," Mechanical Engineering	Penn State Learning	March 1997
		4.	Michelle Griffith and John S. Lamancusa	"Rapid Prototyping Technologies," Rapid Prototyping	Springer	April 2009
	22.2	Supplemental Instruction Materials				
		No.	Author	Title	Publisher	Year
		1.	Ali K. Kamrani, Emad Abouel Nasr	Engineering Design and Rapid Prototyping	Springer-Verlag	June 2009
		2.	Ben Redwood, Filemon Schöffer & Brian Garret	The 3D Printing Handbook: Technologies, design and applications	3D Hubs	November 28, 2017

Add. 3	**Course program for the second level (second cycle - postgraduate) of studies**				
1.	Course title	Intelligent Processes and Smart Technologies			
2.	Code	2VME04			
3.	Study group(s)	Virtual Manufacturing Engineering (VME)			
4.	The organizer of the study program (unit, institute, department)	„Ss. Cyril and Methodius“ University in Skopje, Faculty of Mechanical Engineering – Skopje Institute of Production Engineering and Management			
5.	Level (first, second, third degree)	Second			
6.	Academic year / semester	I/winter	7.	ECTS credits	6

8.	Professor		Prof. d-r Valentina Gecevska	
9.	Prerequisites for enrolling the course		None	
10.	Course objectives (competences): Algorithmic and non-algorithmic methods for intelligent processes design and their application in production technologies and systems. Basic concepts and algorithms for heuristic modeling: decision making, knowledge bases &expert systems, genetic algorithms, evolutionary algorithms, fuzzy logic, neural networks. Design and modeling of intelligent production processes. Characteristics of smart processes and smart technologies application in smart concepts (factory of the future, industry 4.0, smart factory, smart products).			
11.	Course content: Intelligent processes and systems, concept and types. Algorithmic and non-algorithmic methods of design, complementarity with mathematical logic. Heuristic approach. Modeling and process notation tools. Cognitive design and modeling techniques. Basic concepts of artificial intelligence (AI): non-algorithmic approach, symbolic design, knowledge-based decision making logic, search strategies, efficiency. Elements of intelligent systems: knowledge base, heuristic search, presentation of declarative and procedural knowledge (rules, procedures, semantic networks), logical decision, tools and programming languages. Expert Systems (ES). ES methods for modeling and design. Database vs. Knowledge Base. Advanced techniques for intelligent systems design (ISD): discrete simulation, knowledge based systems, neural networks, fuzzy logic, genetic algorithms, evolutionary algorithms. Intelligent Production Processes (IPP): definition, types, structure, development. Modeling and simulation of IPP with application of advanced techniques for ISD. Smart technologies for Factory of the Future in Industry 4.0. Digitalization with advances in information technologies applied in industry and production processes. Application of ICT concepts (IoT, Cloud Computing, Cyber Physical Systems, Digital Twin concept, RFID, Big Data etc.) in manufacturing processes for smart factory, smart products, smart technologies, smart thinking, road to intelligent factory. Smart processes related to: industrial challenges for manufacturing companies, enabling technologies that push development capabilities, domains for development and innovation as, intelligent and adaptive manufacturing systems; digital companies; smart factory with performances and processes agile, connected and optimized across network; digital twin PLM concept for product and manufacturing, person-machine collaboration; customer based manufacturing.			
12.	Study methods: Interactive lectures, auditory and/or laboratory practice, self-running and/or team work on project assignments, self-running assignments			
13.	Total hours		6 ECTS x 30 = 180 hours	
14.	Hours allocation per activity:		30+30+30+30+60=180 hours	
15.	Lectures/Lab	15.1.	Lectures (15 weeks x 2)	30 hours
		15.2.	Lab (student work)	30 hours
16.	Project Work/Assignments	16.1.	Project assignments	30 hours
		16.2.	Individual assignments	30 hours
		16.3.	Self-study	60 hours
17.	Points/Marks:			
	17.1.	Exams		60 %
	17.2.	Projects		30 %
	17.3.	Attendance		10 %
18.	Grading scale		under 50 %	5 (five) (F)

			51-64 %	6 (six) (D)	
			65-74 %	7 (seven) (C)	
			75-84 %	8 (eight) (B-)	
			85-94 %	9 (nine) (A-/B+)	
			95-100 %	10 (ten) (A/A+)	
19.	Prerequisites for taking the final exam		Seminar work delivered and approved		
20.	Language		English		
21.	Course evaluation		Student questionnaire		
22.	Textbooks				
	22.1	Instruction materials			
		No.	Author	Title	Publisher	Year
		1.	Kusiak A.	Computational intelligence in design and manufacturing	New York: John Wiley & Sons, cop.	2016
		2.	Goldbertg D.	Genetic Algorithms, Neural Networks and Fuzzy Logic in Search, Optimization and Machine Learning	AW-Pub.Comp.	2012
		3.	Z.W. Luo	Smart Manufacturing Innovation and Transformation: Interconnection and Intelligence	IGI Global, Publ.	2014
	22.2	Supplemental Instruction Materials			
		No.	Author	Title	Publisher	Year
		1.	Moon I., Lee G., Kiritis D.	Advances in Production Management Systems. Smart Manufacturing for Industry 4.0	Springer	2018
		2.	Cus F. Gecevska V.	Development of Intelligent and Innovative Tools for Production Process Engineering and Sustainable Management	University of Maribor, Slovenia	2013

		3.	Tao F.	Digital Tween Driven Smart Manufacturing	Elsevier	2018

Add. 3	**Course program for the second level (second cycle - postgraduate) of studies**				
1.	Course title	3D Digitalization Processes in Manufacturing			
2.	Code	2VME05			
3.	Study group(s)	Virtual Manufacturing Engineering (VME)			
4.	The organizer of the study program (unit, institute, department)	„Ss. Cyril and Methodius“ University in Skopje, Faculty of Mechanical Engineering – Skopje Institute of Production Engineering and Management			
5.	Level (first, second, third degree)	Second			
6.	Academic year / semester	II/summer	7.	ECTS credits	6
8.	Professor	Prof. dr Atanas Kochov			
9.	Prerequisites for enrolling the	None			
10.	Course objectives (competences): The course objective is complete summary for understanding the reconstruction of 3D scenes through the use of 3D scanning and point clouds. The course deals and describes the theoretical background, and compares the performance of the proposed approaches to that of current state-of-the- art techniques. This course is highly useful to those unfamiliar with laser scanner data gathering including different available techniques and equipment and would serve as a good first choice about these technologies and processing applications. The course will bring students in the era of smart approaches and technologies for virtual engineering, smart companies for digital transformation in production processes by involving 3D digitalization for increasing competitiveness of SME’s.				
11.	Course content: • 3D technologies, 3D scanning and printing • Reviews techniques for the acquisition of 3D point cloud data and for point quality assessment • Explains the fundamental concepts for extracting features from 2D imagery and 3D point cloud data • Proposes an original approach to key point-based point cloud registration • Smart 3D digitalization technologies • Discusses the enrichment of 3D point clouds by additional information acquired with a thermal camera, and describes a new method for thermal 3D mapping • Presents a novel framework for 3D scene analysis, addressing neighborhood selection, feature extraction, feature selection, and classification • Covers each aspect of a typical end-to-end processing workflow, from raw 3D point cloud data to semantic objects in the scene • Application of 3D scanning in different scientific areas and practical issues				
12.	Study methods: Interactive lectures, auditory and/or laboratory practice, self-running and/or team work on project assignments, self-running assignments				
13.	Total hours	6 ECTS x 30 = 180 hours			
14.	Hours allocation per activity:	30+30+30+30+60=180 hours			
15.	Lectures/Lab	15.1.	Lectures (15 weeks x 2)	30 hours	
		15.2.	Lab (student work)	30 hours	

16.	Project Work/Assignments	16.1.	Project assignments	30 hours
		16.2.	Individual assignments	30 hours
		16.3.	Self-study	60 hours
17.	Points/Marks:			
	17.1.	Exams		60 %
	17.2.	Projects		30 %
	17.3.	Attendance		10 %
18.	Grading scale		under 50 %	5 (five) (F)
			51-64 %	6 (six) (D)
			65-74 %	7 (seven) (C)
			75-84 %	8 (eight) (B-)
			85-94 %	9 (nine) (A-/B+)
			95-100 %	10 (ten) (A/A+)
19.	Prerequisites for taking the final	Seminar work delivered and approved		
20.	Language	English		
21.	Course evaluation	Student questionnaire		
22.	Textbooks			

22.1 Instruction materials

No.	Author	Title	Publisher	Year
1.	Samuel N. Bernier and Bertier Luyt	Design for 3D Printing: Scanning, Creating, Editing, Remixing, and Making in Three Dimensions	Maker Media, Inc; 1 edition	October 1, 2015
2.	Martin Weinmann	Reconstruction and Analysis of 3D Scenes: From Irregularly Distributed 3D Points to Object Classes	Springer; 1st ed. 2016 edition	March 17, 2016
3.	Victoria Zukas (Author), Jonas A. Zukas (Author)	An Introduction to 3D Printing	First Edition Design	May 6, 2015

22.2 Supplemental Instruction Materials

No.	Author	Title	Publisher	Year
1.	Brian R. Kent	3D Scientific Visualization with Blender	Morgan & Claypool Publishers	January 7, 2016

Add. 3	**Course program for the second level (second cycle - postgraduate) of studies**	
1.	Course title	Augmented Reality
2.	Code	2VME06
3.	Study group(s)	Virtual Manufacturing Engineering (VME)

4.	The organizer of the study program (unit, institute, department)		"Ss. Cyril and Methodius" University in Skopje, Faculty of Mechanical Engineering - Skopje			
5.	Level (first, second, third degree)		Second			
6.	Academic year / semester		II/summer	7.	ECTS credits	6
8.	Professor		Assistant Prof. dr Tashko Rizov			
9.	Prerequisites for enrolling the course		None			
10.	Course objectives (competences): This course will contribute towards understanding of the elementary components of the advanced visualization techniques in the augmented and virtual reality. Students will obtain knowledge and skills about the functions of the systems for augmented and virtual reality, the hardware and software components and their application and opportunities.					
11.	Course content: Definition and elementary topics of augmented and virtual reality. Historical development of the techniques for 3D visualization. Geometrical projection. Virtual reality. Augmented reality. Systems for augmented reality. Components of the systems for augmented reality. Optical vs. video augmentation. Hardware components of the systems for augmented reality. Determination of position and orientation. Visual systems for determination of position and orientation. Advanced technologies in the devices for determination of position and orientation. Key methods and techniques for augmented reality in relation to computer visualization. Recognition and tracking of pictures and/or schemes. Registration. Occlusion.					
12.	Study methods: Interactive lectures, auditory and/or laboratory practice, self-study and/or team work on project assignments, self-studying assignments					
13.	Total hours		6 ECTS x 30 = 180 hours			
14.	Hours allocation per activity:		30+30+30+30+60=180 hours			
15.	Lectures/Lab	15.1.	Lectures (15 weeks x 2)			30 hours
		15.2.	Lab (student work)			30 hours
16.	Project Work/Assignments	16.1.	Project assignments			30 hours
		16.2.	Individual assignments			30 hours
		16.3.	Self-study			60 hours
17.	Points/Marks:					
	17.1.	Exams				60 %
	17.2.	Projects				30 %
	17.3.	Attendance				10 %
18.	Grading scale		under 50 %			5 (five) (F)
			51-64 %			6 (six) (D)
			65-74 %			7 (seven) (C)
			75-84 %			8 (eight) (B-)
			85-94 %			9 (nine) (A-/B+)
			95-100 %			10 (ten) (A/A+)
19.	Prerequisites for taking the final exam		Seminar work delivered and approved			
20.	Language		English			
21.	Course evaluation		Student questionnaire			
22.	Textbooks					
	22.1	Instruction materials				
		No.	Author	Title	Publisher	Year

		1.	Rizov T.	Fundamentals of augmented reality (in Macedonian)	MFS (Script)	2018
		2.	Woodrow Barfield	Fundamentals of Wearable Computers and Augmented Reality	CRC Press	2015
		3.	Dieter Schmalstieg, Tobias Hollerer	Augmented Reality: Principles and Practice (Usability)	Pearson Education	2017
		4.	Steve Aukstakalnis	Practical Augmented Reality: A Guide to the Technologies, Applications, and Human Factors for AR and VR (Usability)	Pearson Education	2016
	22.2	Supplemental Instruction Materials				
		No.	Author	Title	Publisher	Year
		1.	Cawood, S., Fiala, M.	Augmented Reality: A Practical Guide	Pragmatic Bookshelf	2008

Add. 3	**Course program of the first, second and third level (cycle) of studies**				
1.	Course title	Numerically Controlled Machines and CNC Programming			
2.	Code	2VME07			
3.	Study group(s)	Virtual Manufacturing Engineering (VME)			
4.	The organizer of the study program (unit, institute, department)	„Ss. Cyril and Methodius“ University in Skopje, Faculty of Mechanical Engineering – Skopje Institute of Production Engineering and Management			
5.	Level (first,second,third)	Second			
6.	Academic year/semester	II/winter	7.	ECTS credits	6
8.	Professor	Prof. Dr. Zoran Pandilov			

9.	Prerequisites for enrolling the course	None		
10.	Course objectives (competences): Introduction to the basic characteristics of modern numerically controlled machines, their construction, types and applications. Qualification and ability for programming numerically controlled machines.			
11.	Course content: Numerically Controlled machines. Basic components of numerically controlled machines. Structure of numerically controlled machines (base and frame (motionless) and structural (moving) components). Guideways. Main spindle. Main spindle drives. Feed drives. CNC control unit, Precision of numerically controlled machines. Types of numerically controlled machines and their application. Types of programming of numerically controlled machines. Programming of numerically controlled machines using CAD/CAM software. G-functions for NC milling. M-functions for NC milling. Generating NC programs for milling of 2, 2.5 and 3 D parts using CAD/CAM software. G-functions for NC turning. M-functions for NC turning. Generating NC programs for turning of 2 and 2.5 D parts using CAD/CAM software.			
12.	Study methods: Lectures supported by presentations, interactive lectures, auditory and/or laboratory practice, company visits, guest lecturers from industry, self running and/or team work on project assignments, self running assignments			
13.	Total hours	6 ECTS x 30 hours = 180 hours		
14.	Hours allocation per activity:	30+30+30+30+60=180 hours		
15.	Lectures/Exercises	15.1.	Lectures (15 weeks x 2 hours)	30 hours
		15.2.	Exercises (laboratory, auditory), seminars, team work (15 weeks x 2 hours)	30 hours
16.	Other forms of activity	16.1.	Project assignments	30 hours
		16.2.	Individual assignments	30 hours
		16.3.	Self-study	60 hours
17.	Points/Marks:			
	17.1.	Partial exams		50 %
	17.2.	Project and individual assignments (presentation: written and oral)		40 %
	17.3.	Activity and participation		10 %
18.	Grading criteria (points / grade)	under 50 %		5 (five) (F)
		51-64 %		6 (six) (D)
		65-74 %		7 (seven) (C)
		75-84 %		8 (eight) (B-)
		85-94 %		9 (nine) (A-/B+)
		95-100 %		10 (ten) (A/A+)
19.	Prerequisites for taking the final exam	Realized activities 16.1, 16.2, 16.3		
20.	Language	English, Macedonian		
21.	Method of monitoring the quality of teaching	Mechanisms of internal evaluation and surveys, students questionnaire		
22.	Textbooks			

	22.1.	Instruction materials				
		No.	Author	Title	Publisher	Year
		1.	Zoran Pandilov	Numerically controlled machines and CNC programming –printed lectures		
		2.	Lacalle L.N.L. de, Lamikiz A	Machine Tools for High Performance Machining	Springer	2009
		3.	Alan Overby	CNC Machining Handbook	McGraw-Hill	2011
		4.	Frank Nanfara, Tony Uccello, Derek Murphy	The CNC workshop	Prentice Hall (2nd edition)	2002
	22.2.	Supplemental Instruction Materials				
		No.	Author	Title	Publisher	Year
		1.	N. K. Mehta	Machine Tool Design and Numerical Control	McGraw Hill Education (India) Private Limited	2013
		2.	Suk-Hwan Suh, Seong-Kyoon Kang, Dae-Hyuk Chung, Ian Strou	Theory and design of CNC systems	Springer	2008
		3.	Jaromir Zeleny	Numerically controlled machine tools and accessories	CVUT	1999
		4.	Peter Smid	CNC Programming Handbook (3rd Edition)	Industrial Press Inc.	2008
		5.	James V. Valentino, Joseph Goldenberg	Introduction to Computer Numerical Control (5th Edition)	Pearson	2012

Add. 3	**Course program for the second level (second cycle - postgraduate) of studies**				
1.	Course title	Computer Integrated Manufacturing			
2.	Code	2VME08			
3.	Study group(s)	Virtual Manufacturing Engineering (VME)			
4.	The organizer of the study program (unit, institute, department)	„Ss. Cyril and Methodius“ University in Skopje, Faculty of Mechanical Engineering – Skopje Institute of Production Engineering and Management			
5.	Level (first, second, third degree)	Second degree			
6.	Academic year / semester	II/summer	7.	ECTS credits	6

8.	Professor		Prof. Dr. Sc. Gligorche Vrtanoski		
9.	Prerequisites for enrolling the course		None Completed undergraduate studies		
10.	Course objectives (competences): This course will contribute to getting acquainted with the techniques of at the operations level in manufacturing industries having a concentration in computer applications. The techniques assist in the design and implementation of manufacturing process systems that include numerical control equipment, computer aided part programming, computer aided manufacturing, factory automation, and flexible manufacturing cells and systems.				
11.	Course content: Introduction of Computer Integrated Manufacturing. CIM is used to describe the complete automation of a manufacturing plant, with all processes functioning under computer control with digital information tying them together. Overview computer aided manufacturing (link from CAD to the production machine). Recapitulation of CAD modeling to serve as the basis for the further detailed CAM systems. Principles of tool path generation (CAM) for various purposes ex. machining of complex shapes. Feature-based tool path generation. NC post-processors. The Robots in manufacturing are comprised the simulation and programming of a robot cell. Methods of computer aided engineering CAE to analyze and optimize complex structures. Principles, methods and algorithms for computer aided process planning. Computer controlled clamping of workpieces. Computer aided quality control CAQ. Through the integration of computers, manufacturing can be faster and less error-prone. The main advantages of CIM are the ability to create flexible design and automated manufacturing processes.				
12.	Study methods: Interactive lectures, auditory and/or laboratory practice, self running and/or team work on project assignments, self running assignments				
13.	Total hours		6 ECTS x 30 = 180 hours		
14.	Hours allocation per activity:		30+20+80+20+30=180 hours		
15.	Lectures/Lab	15.1.	Lectures (15 weeks x 2)		30 hours
		15.2.	Lab (student work)		20 hours
16.	Project Work/Assignments	16.1.	Project assignments		80 hours
		16.2.	Individual assignments		20 hours
		16.3.	Self-study		30 hours
17.	Points/Marks:				
	17.1.	Exams			30 %
	17.2.	Projects			60 %
	17.3.	Attendance			10 %
18.	Grading scale		under 50 %		5 (five) (F)
			51-64 %		6 (six) (D)
			65-74 %		7 (seven) (C)
			75-84 %		8 (eight) (B-)
			85-94 %		9 (nine) (A-/B+)
			95-100 %		10 (ten) (A/A+)
19.	Prerequisites for taking the final exam		Seminar works delivered and approved		
20.	Language		English, Macedonian		
21.	Course evaluation		Student questionnaire and other methods for continual self evaluation		
22.	Textbooks				

22.1 Instruction materials

No.	Author	Title	Publisher	Year
1.	Gligorche Vrtanoski	Unauthorized lectures of CIM	Faculty of Mechanical	2018

					Engineering	
		2.	K. Asai, S. Takashima	Manufacturing, Automation Systems and CIM Factories	Springer	2001
		3.	Mikell P. Groover	Automation, production systems, and computer-integrated Manufacturing	Prentice Hall Press	2007
	22.2	Supplemental Instruction Materials				
		No.	Author	Title	Publisher	Year
		1.	James A. Rehg	Introduction to Robotics in CIM Systems	Prentice Hall Press	2002
		2.	James A. Rehg, Henry W. Kraebber	Computer Integrated Manufacturing	Prentice Hall Press	2004
		3.	Kunwoo Lee	Principles of CAD/CAM/CAE Systems	Prentice Hall Press	1999

Add. 3	**Course program for the second level (second cycle - postgraduate) of studies**				
1.	Course title	Modeling and Simulation of Plastic Deformation Technologies and Tools			
2.	Code	2MSPDTP04			
3.	Study group(s)	Modeling and Simulation of Plastic Deformation Technologies and Processes			
4.	The organizer of the study program (unit, institute, department)	„Ss. Cyril and Methodius“ University in Skopje, Faculty of Mechanical Engineering – Skopje Institute of Production Engineering and Management			
5.	Level (first, second, third degree)	Second			
6.	Academic year / semester	I/winter	7.	ECTS credits	6
8.	Professor	Prof. dr Jasmina Chaloska			
9.	Prerequisites for enrolling the course	None			
10.	Course objectives (competences): Understand the different models of plastic and elastic-plastic behaviour of engineering materials, strategies of the numerical simulation of plastic deformation technologies. design, calculation and modeling of tools. Design and develop new products, by using smart approaches, technologies and tools, as well as the optimization of other already developed, based on the selection of materials for specific applications. Simulation of plastic deformation technologies and tools by using modern software (SOLIDWORKS, SOLIDWORKS Plastics, QForm). Students will be able to solve the practical problems and challenges of modern production, in the design of technologies and the construction of forming tools.				

11.	Course content: Modeling and simulation of forming processes. Introduction to smart technologies for designing and modelling the technologies for plastic deformation. Methods for solving plastic deformation processes. Plastic and elastoplastic stress-strain relationship anisotropy and plastic deformation of metallic products during their cold working, modeling of the plastic deformation at high temperatures of metallic materials, fundamental description of metal forming technologies, overview of presses and tool design, theories of failure in the study of plastic flow of metals, metal forming equipment plastic ratio, grid circle analysis, forming limit diagrams, commercial tests. Fundamentals of plasticity, including plastic instability. The true stress - true strain curve, strength co-efficient k and work hardening coefficient n. Modeling and Simulation of forming tools Tools, types of tools, characteristics, design and calculation. Simulation of plastic deformation technologies and tools by using software for modeling and simulation plastic deformation technologies and tools (QForm, SOLIDWORKS,SOLIDWORKS Plastics). The intelligent systems for advanced approaches and expert systems for designing the plastic deformation processes for creating competitive industry.			
12.	Study methods: Interactive lectures, auditory and/or laboratory practice, self running and/or team work on project assignments, self running assignments			
13.	Total hours		6 ECTS x 30 = 180 hours	
14.	Hours allocation per activity:		30+30+30+30+60=180 hours	
15.	Lectures/Lab	15.1.	Lectures (15 weeks x 2)	30 hours
		15.2.	Lab (student work)	30 hours
16.	Project Work/Assignments	16.1.	Project assignments	30 hours
		16.2.	Individual assignments	30 hours
		16.3.	Self-study	60 hours

17.	Points/Marks:		
	17.1.	Exams	70 %
	17.2.	Projects	20 %
	17.3.	Attendance	10 %

18.	Grading scale	under 50 %	5 (five) (F)
		51-64 %	6 (six) (D)
		65-74 %	7 (seven) (C)
		75-84 %	8 (eight) (B-)
		85-94 %	9 (nine) (A-/B+)
		95-100 %	10 (ten) (A/A+)

19.	Prerequisites for taking the final exam	Seminar work delivered and approved
20.	Language	English
21.	Course evaluation	Student questionnaire
22.	Textbooks	

22.1 Instruction materials

No.	Author	Title	Publisher	Year
1.	Marc André Meyers, Krishan Kumar Chawla	Mechanical Behavior of Materials	Cambridge University Press	2008

		2.	Totten, G.E., Xie, L. and Funatani, K.	Modeling and Simulation for Material Selection and Mechanical Design	CRC Press	2003
		3.	R. E. Goforth, K. T. Hartwig, L. R. Cornwell	Investigations and Applications of Severe Plastic Deformation	Springer Netherlands	2000
	22.2	Supplemental Instruction Materials				
		No.	Author	Title	Publisher	Year
		1.	Hafner, J.	Materials simulations using VASP—a quantum perspective to materials science	Computer physics communications Vancouver	2007

Add. 3	**Course program of the first, second and third level (cycle) of studies**					
1.	Course title	Virtual Design of Production Systems and Machines				
2.	Code	2VME09				
3.	Study group(s)	Virtual Manufacturing Engineering (VME)				
4.	The organizer of the study program (unit, institute, department)	„Ss. Cyril and Methodius“ University in Skopje, Faculty of Mechanical Engineering – Skopje Institute of Production Engineering and Management				
5.	Level (first, second, third)	Second				
6.	Academic year/semester	II/summer	7.	ECTS credits	6	
8.	Professor	Prof. Dr. Sc. Zoran Pandilov Prof. Dr. Sc. Gligorche Vrtanoski				
9.	Prerequisites for enrolling the course	None				
10.	Course objectives (competences): Introduction and application of basic tools for virtual design of production systems and machines					
11.	Course content: Theoretical bases of virtual design of production systems and machines. Basic tools for virtual design of production systems and machines. CAD/CAM systems. CAD/CAM software. CAE software. CAPP software. General simulation software. Software for simulation control systems. Virtual reality. Virtual reality software.					
12.	Study methods: Lectures supported by presentations, interactive lectures, auditory and/or laboratory practice, company visits, guest lecturers from industry, self running and/or team work on project assignments, self running assignments					
13.	Total hours	6 ECTS x 30 hours = 180 hours				
14.	Hours allocation per activity:	30+30+30+30+60=180 hours				
15.	Lectures/Exercises	15.1.	Lectures (15 weeks x 2 hours)	30 hours		
		15.2.	Exercises (laboratory, auditory), seminars, team work (15 weeks x 2 hours)	30 hours		
16.	Other forms of activity	16.1.	Project assignments	30 hours		

		16.2.	Individual assignments	30 hours
		16.3.	Self-study	60 hours

17.	Points/Marks:		
	17.1.	Partial exams	50 %
	17.2.	Project and individual assignments (presentation: written and oral)	40 %
	17.3.	Activity and participation	10 %

18.	Grading criteria (points / grade)	under 50 %	5 (five) (F)
		51-64 %	6 (six) (D)
		65-74 %	7 (seven) (C)
		75-84 %	8 (eight) (B-)
		85-94 %	9 (nine) (A-/B+)
		95-100 %	10 (ten) (A/A+)
19.	Prerequisites for taking the final exam	Realized activities 16.1, 16.2, 16.3	
20.	Language	English, Macedonian	
21.	Method of monitoring the quality of teaching	Mechanisms of internal evaluation and surveys, students questionnaire	

22. Textbooks

22.1. Instruction materials

No.	Author	Title	Publisher	Year
1.	Zoran Pandilov	Virtual design of production systems and machines –printed lectures		
2.	Kunwoo Lee	Principles of CAD/CAM/CAE	Prentice Hall	1999
3.	Wasim Ahmed Khan, Abdul Raouf, Kai Cheng	Virtual Manufacturing	Springer	2011
4.	Devendra K. Chaturvedi	Modeling and Simulation of Systems Using MATLAB and Simulink	CRC Press	2009
5	Philippe Fuchs, Guillaume Moreau, Pascal Guitton	Virtual Reality: Concepts and Technologies 1st Edition	CRC Press	2011

22.2. Supplemental Instruction Materials

No.	Author	Title	Publisher	Year
1.	Mohammad Nuruzzaman	Modeling and Simulation In SIMULINK for Engineers and Scientists	Author House	2005
2.	Oliver Zirn	Modelbildung und Simulation mechatronischer Systeme	Expert Verlag,	2002
3.	Mihelj Matjaž, Novak Domen, Beguš Samo	Virtual Reality Technology and Applications	Springer	2014
4.	Prashant Banerjee, Dan Zetu	Virtual Manufacturing 1st Edition	Wiley	2001
5.	Kuang-Hua Chang	Design Theory and Methods using CAD/CAE	Academic Press	2014

Add. 3	**Course program for the second level (second cycle - postgraduate) of studies**				
1.	Course title	**Ergonomic systems**			
2.	Code	2LM14			
3.	Study group(s)	Lean Management, VME			
4.	The organizer of the study program (unit, institute, department)	„Ss. Cyril and Methodius“ University in Skopje, Faculty of Mechanical Engineering – Skopje Institute of Production Engineering and Management			
5.	Level (first, second, third degree)	Second			
6.	Academic year / semester	II/summer	7.	ECTS credits	6
8.	Professor	Prof. dr Jasmina Chaloska			
9.	Prerequisites for enrolling the course	None			
10.	Course objectives (competences): Enhance understanding in an area of ergonomics systems, and to develop skills applicable in a wide range of circumstances. The student is expected to develop skills in research, investigation, planning, scheduling, evaluation and written communication. This course is designed to be undertaken by students in any organisation who can apply ergonomics in their work. The candidates will apply the material and ideas from this ergonomics course to a real ergonomics investigation of value to their organisation.				
11.	Course content: The course topics include: introduction to ergonomics; the body at work; anthropometry; simple biomechanics; workplace design; work seating; work related upper limb disorders; manual handling; display screen equipment; effects of environmental factors; influence of work organization, risk assessment, virtual design of working places, practice within organizations; ethical issues; legislation, standards and competencies when applying ergonomics; presentation skills; practical ergonomics tasks within organizations.				
12.	Study methods: Interactive lectures, auditory and/or laboratory practice, self running and/or team work on project assignments, self running assignments				
13.	Total hours	6 ECTS x 30 = 180 hours			
14.	Hours allocation per activity:	30+30+30+30+60=180 hours			
15.	Lectures/Lab	15.1.	Lectures (15 weeks x 2)	30 hours	
		15.2.	Lab (student work)	30 hours	
16.	Project Work/Assignments	16.1.	Project assignments	30 hours	
		16.2.	Individual assignments	30 hours	
		16.3.	Self-study	60 hours	
17.	Points/Marks:				
	17.1.	Exams		70 %	
	17.2.	Projects		20 %	
	17.3.	Attendance		10 %	
18.	Grading scale	under 50 %	5 (five) (F)		
		51-64 %	6 (six) (D)		
		65-74 %	7 (seven) (C)		
		75-84 %	8 (eight) (B-)		
		85-94 %	9 (nine) (A-/B+)		
		95-100 %	10 (ten) (A/A+)		
19.	Prerequisites for taking the final exam	Seminar work delivered and approved			
20.	Language	English			
21.	Course evaluation	Student questionnaire			

22.	Textbooks					
	22.1	Instruction materials				
		No.	Author	Title	Publisher	Year
		1.	J. Chaloska	Ergonomic systems	Internal book, MFS	2017
		2.	R.S. Bridger	Introduction to Ergonomics	Taylor & Francis	2003
		3.				
	22.2	Supplemental Instruction Materials				
		No.	Author	Title	Publisher	Year
		1.	Scott Openshaw, Erin Taylor	Ergonomics and Design	Allsteel Inc.	2006

Add. 3	**Course program for the second level (second cycle - postgraduate) of studies**				
1.	Course title	Selected Topics in Mathematics and Informatics			
2.	Code	2OMI01			
3.	Study group(s)	ММС, МХТ, МВ, МЗКИ, ТМЛ, НПТС, ТИ, АФИ, ИИМ, ЕЕ, VME			
4.	The organizer of the study program (unit, institute, department)	„Ss. Cyril and Methodius“ University in Skopje, Faculty of Mechanical Engineering – Skopje Institute of Production Engineering and Management			
5.	Level (first, second, third degree)	Second			
6.	Academic year / semester	I/winter or summer	7.	ECTS credits	6
8.	Professor	Prof. dr Dushan Chakmakov Prof. dr Aleksa Malcheski Prof. dr Nikola Tuneski			
9.	Prerequisites for enrolling the course	None			
10.	Course objectives (competences): Introduction to specific topics in applied mathematics, probability and statistics and specific applicative software for problem solving in engineering.				
11.	Course content: According to the student interests, the course incudes some of the following topics: linear algebra, numerical and optimization methods, complex analysis, probability and statistics focused on problems in engineering. Use of specific programming techniques, applicative software and basic topics in databases and intelligent systems.				
12.	Study methods: Interactive lectures, auditory and/or laboratory practice, selfrunning and/or team work on project assignments, selfrunning assignments				
13.	Total hours	6 ECTS x 30 = 180 hours			
14.	Hours allocation per activity:	30+30+30+30+60=180 hours			
15.	Lectures/Lab	15.1.	Lectures (15 weeks x 2)	30 hours	
		15.2.	Lab (student work)	30 hours	
16.	Project Work/Assignments	16.1.	Project assignments	30 hours	
		16.2.	Individual assignments	30 hours	

		16.3.	Self-study		60 hours
17.	Points/Marks:				
	17.1.	Exams			60 %
	17.2.	Projects			30 %
	17.3.	Attendance			10 %
18.	Grading scale		under 50 %		5 (five) (F)
			51-64 %		6 (six) (D)
			65-74 %		7 (seven) (C)
			75-84 %		8 (eight) (B-)
			85-94 %		9 (nine) (A-/B+)
			95-100 %		10 (ten) (A/A+)
19.	Prerequisites for taking the final exam		Seminar work delivered and approved		
20.	Language		English		
21.	Course evaluation		Student questionnaire		
22.	Textbooks				
	22.1	Instruction materials			
		No.	Author	Title	Publisher	Year
		1.		Actual literature for topics which are subjects of the study.		
		2.	Mendenhal W., Sincich T.	Statistics for Engineering and the Sciences	Maxwel Macmillan Int. Ed., New York	1992
		3.	R. Fletcher	Practical Methods of Optimization	John Wiley &	2000
	22.2	Supplemental Instruction Materials				
		No.	Author	Title	Publisher	Year
		1.	Hari V., Rogina M. Singer S., and others	Numerical Analysis	University of Zagreb	2003

Add. 3	**Course program for the second level (second cycle - postgraduate) of studies**			
1.	Course title	Database Systems		
2.	Code	2OMI07		
3.	Study group(s)	Virtual Manufacturing Engineering (VME)		
4.	The organizer of the study program (unit, institute, department)	„Ss. Cyril and Methodius“ University in Skopje, Faculty of Mechanical Engineering – Skopje Institute of Production Engineering and Management		
5.	Level (first, second, third degree)	Second		
6.	Academic year / semester	I/winter or summer	7. ECTS credits	6
8.	Professor	Prof. dr Dushan Chakmakov		
9.	Prerequisites for enrolling the course	None		

10.	Course objectives (competences): Introduction to methods of grouping and presentation of data and design and development of relational data bases.				
11.	Course content: Files and data bases. Modeling using entities and attributes. Relational data base model and normalization. Using SQL. Design and implementation of data bases in chosen software package.				
12.	Study methods: Interactive lectures, auditory and/or laboratory practice, selfrunning and/or team work on project assignments, selfrunning assignments				
13.	Total hours		6 ECTS x 30 = 180 hours		
14.	Hours allocation per activity:		30+30+30+30+60=180 hours		
15.	Lectures/Lab	15.1.	Lectures (15 weeks x 2)	30 hours	
		15.2.	Lab (student work)	30 hours	
16.	Project Work/Assignments	16.1.	Project assignments	30 hours	
		16.2.	Individual assignments	30 hours	
		16.3.	Self-study	60 hours	
17.	Points/Marks:				
	17.1.	Exams		60 %	
	17.2.	Projects		30 %	
	17.3.	Attendance		10 %	
18.	Grading scale		under 50 %	5 (five) (F)	
			51-64 %	6 (six) (D)	
			65-74 %	7 (seven) (C)	
			75-84 %	8 (eight) (B-)	
			85-94 %	9 (nine) (A-/B+)	
			95-100 %	10 (ten) (A/A+)	
19.	Prerequisites for taking the final exam		Seminar work delivered and approved		
20.	Language		English		
21.	Course evaluation		Student questionnaire		
22.	Textbooks				

22.1 Instruction materials

No.	Author	Title	Publisher	Year
1.	Connolly T. and Begg C.	Database Systems	Pearson	2009
2.				
3.				

22.2 Supplemental Instruction Materials

No.	Author	Title	Publisher	Year
1.	Oppel A.	Database Demystified	McGrow-Hill	2004

Add. 3	**Course program for the second level (second cycle - postgraduate) of studies**	
1.	Course title	Business Information Systems
2.	Code	2IIM14
3.	Study group(s)	IIM, VME

4.	The organizer of the study program (unit, institute, department)		„Ss. Cyril and Methodius“ University in Skopje, Faculty of Mechanical Engineering – Skopje Institute of Production Engineering and Management			
5.	Level (first, second, third degree)		Second			
6.	Academic year / semester		II/summer	7.	ECTS credits	6
8.	Professor		Prof. dr Robert Minovski			
9.	Prerequisites for enrolling the course		None			
10.	Course objectives (competences): The main objective of the course is to prepare the participants to be capable of doing analysis of the influence of information systems on certain aspects of the organizations and to determine approaches to optimize those aspects.					
11.	Course content: Types of information systems. Methodologies for design of information systems; hardware and software; data bases. Strategic use of information. Organizational impacts of information systems. Information Technology (IT) and the design of work/work places. IT and improvement of business processes. Knowledge Management and visualization.					
12.	Study methods: Interactive lectures, team work (if applicable), project assignments					
13.	Total hours		6 ECTS x 30 = 180 hours			
14.	Hours allocation per activity:		30+30+30+30+60=180 hours			
15.	Lectures/Lab	15.1.	Lectures (15 weeks x 2)			30 hours
		15.2.	Lab (student work)			30 hours
16.	Project Work/Assignments	16.1.	Project assignments			30 hours
		16.2.	Individual assignments			30 hours
		16.3.	Self-study			60 hours
17.	Points/Marks:					
	17.1.	Exams				50 %
	17.2.	Projects				50 %
	17.3.	Attendance				
18.	Grading scale		under 50 %			5 (five) (F)
			51-64 %			6 (six) (D)
			65-74 %			7 (seven) (C)
			75-84 %			8 (eight) (B-)
			85-94 %			9 (nine) (A-/B+)
			95-100 %			10 (ten) (A/A+)
19.	Prerequisites for taking the final exam		Seminar work delivered and approved			
20.	Language		English			
21.	Course evaluation		Student questionnaire			
22.	Textbooks					
	22.1	Instruction materials				
		No.	Author	Title	Publisher	Year

		1.	/	Actual materials (presentations, papers, …) in the field of Business Info. Systems	/	/
		2.	K. Pearlson, C. Saunders	Managing and using information systems	Jonh Wiley & Sons Inc	2006
		3.				
	22.2	Supplemental Instruction Materials				
		No.	Author	Title	Publisher	Year
		1.				

Add. 3	**Course program for the second level (second cycle - postgraduate) of studies**			
1.	Course title	TQM		
2.	Code	2LM10		
3.	Study group(s)	Lean Management (LM), VME		
4.	The organizer of the study program (unit, institute, department)	„Ss. Cyril and Methodius“ University in Skopje, Faculty of Mechanical Engineering – Skopje Institute of Production Engineering and Management		
5.	Level (first, second, third degree)	Second degree		
6.	Academic year / semester	II/summer	7.	ECTS credits 6
8.	Professor	Prof. Dr. Sc. Gligorche Vrtanoski		
9.	Prerequisites for enrolling the course	None Completed undergraduate studies		
10.	Course objectives (competences): This course will contribute to getting acquires knowledge about the overall activities that are undertaken within an organization to achieve the goals of the Total Quality Management philosophy.			
11.	Course content: Introduction to Total Quality Management philosophy as a tool for improving the performances of companies. Basics of TQM. Customer focus and satisfaction. Participation and teamwork. Process management and continuous improvement. Infrastructure, practice, quality tools and techniques. Quality function deployment. Leadership and strategic planning. Management of measurements and strategic information. Human resources management. Performance measures. Audit, evaluation and final scores. Organization and implementation of TQM.			

12.	Study methods: Interactive lectures, auditory and/or laboratory practice, self running and/or team work on project assignments, self running assignments				
13.	Total hours		6 ECTS x 30 = 180 hours		
14.	Hours allocation per activity:		30+20+80+20+30=180 hours		
15.	Lectures/Lab	15.1.	Lectures (15 weeks x 2)	30 hours	
		15.2.	Lab (student work)	20 hours	
16.	Project Work/Assignments	16.1.	Project assignments	80 hours	
		16.2.	Individual assignments	20 hours	
		16.3.	Self-study	30 hours	
17.	Points/Marks:				
	17.1.	Exams		30 %	
	17.2.	Projects		60 %	
	17.3.	Attendance		10 %	
18.	Grading scale		under 50 %	5 (five) (F)	
			51-64 %	6 (six) (D)	
			65-74 %	7 (seven) (C)	
			75-84 %	8 (eight) (B-)	
			85-94 %	9 (nine) (A-/B+)	
			95-100 %	10 (ten) (A/A+)	
19.	Prerequisites for taking the final exam		Seminar works delivered and approved		
20.	Language		English, Macedonian		
21.	Course evaluation		Student questionnaire and other methods for continual self evaluation		

22. Textbooks

22.1 Instruction materials

No.	Author	Title	Publisher	Year
1.	Gligorche Vrtanoski	Unauthorized lectures of the Methods and Techniques of TQM	Faculty of Mechanical Engineering	2018
2.	Stephen George, Arnold Weimerskirch	Total Quality Management - Strategies and Techniques	John Wilye & Sons	1998
3.	John Oakland	TQM Text with Cases	Butterworth Heinemann	2003

22.2 Supplemental Instruction Materials

No.	Author	Title	Publisher	Year
1.	Fiorenzo Franceschini	Advanced Quality Function Deployment	ST. Lucie Press	2002
2.	Tauseef Aized	Total Quality Management and Six Sigma	InTech	2012
3.	Graeme Knowles	Quality Management	Bookboon.com	2011

Add. 3	**Course program for the second level (second cycle - postgraduate) of studies**					
1.	Course title	Product Data Engineering				
2.	Code	2VME12				
3.	Study group(s)	Virtual Manufacturing Engineering (VME)				
4.	The organizer of the study program (unit, institute, department)	„Ss. Cyril and Methodius“ University in Skopje, Faculty of Mechanical Engineering – Skopje Institute of Production Engineering and Management				
5.	Level (first, second, third degree)	Second				
6.	Academic year / semester	I/winter-summer	7.	ECTS credits	6	
8.	Professor	Prof. PhD Valentina Gecevska				
9.	Prerequisites for enrolling the course	None				
10.	Course objectives (competences): Knowledge for the concept and functions of PDM-Product Data Management as a main concept of product data engineering by mastering the design, and exchange for all phases of the product life cycle. Basic knowledge for PDM conceptual modeling and its components for uniquely modeling connected to design, planning, production and exploitation of the product.					
11.	Course content: Main concept of product data engineering Product Data Management (PDM). Virtual product development. Information model. Digital chain, value aided production, digital factory. Global products concepts. Life cycle concept, life cycle phases, data modeling methods and tools for global product concept through life cycle. Generic PDM applications: part/product, process/workflow, data/document, program/project, collaboration, visualization, integration. Information platforms and software for PDM as well as methods for modeling unique application. Integration with CAPP (Computer Aided Process Planning) and collaborative platforms in line to CIM concept.					
12.	Study methods: Interactive lectures, auditory and/or laboratory practice, self-running and/or team work on project assignments, self-running assignments					
13.	Total hours	6 ECTS x 30 = 180 hours				
14.	Hours allocation per activity:	30+30+30+30+60=180 hours				
15.	Lectures/Lab	15.1.	Lectures (15 weeks x 2)	30 hours		
		15.2.	Lab (student work)	30 hours		
16.	Project Work/Assignments	16.1.	Project assignments	30 hours		
		16.2.	Individual assignments	30 hours		
		16.3.	Self-study	60 hours		
17.	Points/Marks:					
	17.1.	Exams	60 %			
	17.2.	Projects	30 %			
	17.3.	Attendance	10 %			
18.	Grading scale	under 50 %	5 (five) (F)			
		51-64 %	6 (six) (D)			
		65-74 %	7 (seven) (C)			
		75-84 %	8 (eight) (B-)			

			85-94 %		9 (nine) (A-/B+)
			95-100 %		10 (ten) (A/A+)
19.	Prerequisites for taking the final exam		Seminar work delivered and approved		
20.	Language		English		
21.	Course evaluation		Student questionnaire		
22.	Textbooks				
	22.1	Instruction materials			
		No.	Author	Title	Publisher	Year
		1.	Watts F.	Product Data Engineering: system engineering and implementation	CRC Press	2017
		2.	Abraham J.	Product	Springer	2014
		3.	Stark J.	Product Data Management	Springer	2015
	22.2	Supplemental Instruction Materials			
		No.	Author	Title	Publisher	Year
		1.	Blockdyk G.	Siemens PLM Software –Vision and Industry 4.0	Springer	2018
		2.				
		3.				

17. List of the teaching staff, including the data stated in Article 5 of the Rulebook on the Mandatory Components of the Study Programmes of the First, Second, and Third Cycle („Official Gazette of the Republic of Macedonia“ No. 25/2011) and the Rulebook on Changes and Amendments of the Rulebook on the Mandatory Components of the Study Programmes of the First, Second, and Third Cycle („Official Gazette of the Republic of Macedonia“ No. 154/2011)

The following professors participate in the realisation of the Virtual manufacturing engineering study programme:

1. Professor Gligorche Vrtanoski
2. Professor Zoran Pandilov
3. Professor Valentina Gechevska
4. Professor Atanas Kochov
5. Professor Jasmina Chaloska
6. Professor Robert Minovski
7. Professor Cakmakov Dusan
8. Professor Aleska Malcheski

9. Professor Nikola Tuneski
10. Assistant professor Tashko Rizov

When needed, teaching staff members from other organisational units (institutes, departments) of the Faculty of Mechanical Engineering in Skopje, as well as from other higher education institutions, take part in the realization of the instruction, pursuant to the legal procedure for election of course programmes and engagement of teaching staff in the instruction process.

The Educational and Scientific Board of the Faculty pays special attention to securing that the provisions of the Law on Higher Education regarding the workload of the teaching staff members are met.

<table>
<tr><td colspan="2">Add. 4</td><td colspan="4">Information about the teachers that lecture at the first, second and third study program and are mentors on the doctoral thesis</td></tr>
<tr><td>1.</td><td colspan="2">Name (First, Last)</td><td colspan="4">Gligorche Vrtanoski</td></tr>
<tr><td>2.</td><td colspan="2">Date of birth</td><td colspan="4">April 15, 1966</td></tr>
<tr><td>3.</td><td colspan="2">Scientific degree / Title</td><td colspan="4">Ph.D.</td></tr>
<tr><td>4.</td><td colspan="2">Title of the scientific degree</td><td colspan="4">Ph.D. in Technical Sciences</td></tr>
<tr><td rowspan="4">5.</td><td colspan="2" rowspan="4">Year and institution of the scientific degree</td><td>Education</td><td>Year</td><td colspan="2">Institution</td></tr>
<tr><td>Ph.D. in Mechanical Engineering</td><td>2003</td><td colspan="2">Faculty of Mechanical engineering - Skopje</td></tr>
<tr><td>M.Sc. in Mechanical Engineering</td><td>1996</td><td colspan="2">Faculty of Mechanical engineering - Skopje</td></tr>
<tr><td>B.Sc. in Mechanical Engineering</td><td>1991</td><td colspan="2">Faculty of Mechanical engineering - Skopje</td></tr>
<tr><td rowspan="2">6.</td><td colspan="2" rowspan="2">Area, field and particular specialty of master of science degree</td><td>Area</td><td>Field</td><td colspan="2">Specialty</td></tr>
<tr><td>Technical-technology sciences</td><td>Mechanical engineering</td><td colspan="2">Integrated CAD/CAM/CAE/ Systems and FEM of composite material structures</td></tr>
<tr><td rowspan="2">7.</td><td colspan="2" rowspan="2">Area, field and area of doctoral degree</td><td>Area</td><td>Field</td><td colspan="2">Specialty</td></tr>
<tr><td>Technical-technology sciences</td><td>Mechanical engineering</td><td colspan="2">Design of Machine Tool Structures with Composite Materials</td></tr>
<tr><td rowspan="2">8.</td><td colspan="2" rowspan="2">If employed, state the institution where he/she works and the title and area in which is named</td><td colspan="2">Institution</td><td colspan="2">Title and area</td></tr>
<tr><td colspan="2">UKIM, Faculty of Mechanical Engineering</td><td colspan="2">Full time professor of Mechanical engineering</td></tr>
<tr><td>9.</td><td colspan="6">List of courses that the teacher is lecturing separately for first, second and third cycle</td></tr>
<tr><td></td><td>9.1.</td><td colspan="5">List of courses that the teacher is lecturing in the first cycle</td></tr>
<tr><td></td><td></td><td>No.</td><td>Course</td><td colspan="2">Study program/institution</td></tr>
<tr><td></td><td></td><td>1.</td><td>Design, Testing and Maintenance of Machine Tools</td><td colspan="2">Production Engineering</td></tr>
<tr><td></td><td></td><td>2.</td><td>Quality Management</td><td colspan="2">Industrial Engineering and Management</td></tr>
<tr><td></td><td></td><td>3.</td><td>Computer Aided Product Development</td><td colspan="2">Production Engineering</td></tr>
<tr><td></td><td></td><td>4.</td><td>Computer Design and Animations</td><td colspan="2">Production Informatics</td></tr>
<tr><td></td><td></td><td>5.</td><td>Internet and Web Design</td><td colspan="2">Production Informatics</td></tr>
<tr><td></td><td></td><td>6.</td><td>Business Processes and Metrics</td><td colspan="2">Production Informatics</td></tr>
<tr><td></td><td>9.2.</td><td colspan="5">List of courses that the teacher is lecturing in the second cycle</td></tr>
<tr><td></td><td></td><td>No.</td><td>Course</td><td colspan="2">Study program/institution</td></tr>
<tr><td></td><td></td><td>1.</td><td>Product Development</td><td colspan="2">Production engineering</td></tr>
</table>

		2.	Management of Processes	Production engineering
		3.	Management of Development of New Products and Processes	Metrology, Management and Quality Control
		4.	Methods and Techniques of TQM	Metrology, Management and Quality Control
		5.	Development and Management of Products	Product Life-Cycle Management – PLM
		6.	Modeling and Simulation of Physical Systems	Production engineering
	9.3.	List of courses that the teacher is lecturing in the third cycle		
		No.	Course	Study program/institution
		1.	CAx Technologies	Mechanical engineering
		2.	Substitution of the Materials	Mechanical engineering
		3.	Management of Development of New Products	Mechanical engineering

10. Selected work in the past five years

10.1. Relevant scientific printed paper (up to 5)

No.	Author	Title	Publisher/Year
1.	Simona Domazetovska, Gligorche Vrtanoski, Dame Dimitrovski	Description and Analysis of Energy Management Information Systems, As a Useful Management Tool	Mechanical Scientific Engineering Journal, Vol. 35, No. 1, pp 61-72, Skopje 2017, Coden: MINSC5, ISSN 1857-5293, UDC 621.
2.	Nace Manushev, Gligorche Vrtanoski	Creating a Conceptual Innovation Model for Development of the Companies	Mechanical Scientific Engineering Journal, Vol. 35, No. 1, pp 17-30, Skopje 2017, Coden: MINSC5, ISSN 1857-5293, UDC 621.
3.	Zoran Pandilov, Betim Shabani, Dejan Shishkovski, Gligorche Vrtanoski	Reverse Engineering – An Effective Tool for Design and Development of Mechanical Parts	ACTA Technica Corviniensis – Bulletin for Engineering, Tome XI (2018) Fascicule 2 (April – June), e-ISSN: 2067 - 3809 (online)
4.	Marija Naskova, Gligorche Vrtanoski	Digital Marketing – Tool for Extending Product Lifecycle	Mechanical Scientific Engineering Journal, Vol. 34, No. 1, pp 415-422, Skopje 2016, Coden: MINSC5, ISSN 1857-5293, UDC 621.
5.	Kire Dimanoski, Gligorche Vrtanoski, Gordan Stojich	Simulation Model for Dimensioning Capacity of Border Railway Stations	Mechanical Scientific Engineering Journal, Vol. 34, No. 1, pp 27-33, Skopje 2016, Coden: MINSC5, ISSN 1857-5293, UDC 621.

10.2. Participation in scientific national and international projects (up to 5)

No.	Author	Title	Publisher/year
1.	Vrtanoski Gligorce (local team leader):	*EBRD Project No. C32161:* Rail Corridor VIII: First	International Project financed by European

				Phase / Fleet Renewal Project - Design and Implementation of Energy Management Information System in the Rail Sector, (01/2016 – Present (07/2019), Client: / Funding: EBRD Grant to MRT JSC Skopje and PERI Skopje / EBRD Grant, SubContractor: PADECO, Tokyo, Japan, Position: Local Team Leader and Railway Rolling Stock Expert.	Bank for Reconstruction and Development / (01/2016 – 07/2019).
		2.	Vrtanoski Gligorce (team leader):	*EBRD Project No. C32418CC:* Business Segmentation and Fleet Management Advisory Services for Railway Transport Company, (11/2015 – Present (10/2018), Client: / Funding: EBRD Grant to Ministry of Transport and Communication / EBRD Grant, SubContractor: PricewaterhouseCoopers, Rome, Italy, Position: Local Team Leader and Fleet Management Expert.	International Project financed by European Bank for Reconstruction and Development / (11/2015 – 10/2018).
		3.	Vrtanoski Gligorce:	Management support for the integrated tariff environment (ITE) systems 2011S 118-193705 Publication Reference *EuropeAid13366DSERMK,* (08/2013 – 07/2014) Client: / Funding: FAA Gmbh, address Heiligenstädter Lände 29, 1190, Wien, Austria, Position: Manager for Recruiting Experts and Supervision of their work	International Project financed by European Commision / (08/2013 – 07/2014).
		4.	Vrtanoski Gligorce (team leader):	*EBRD Project No. 43997, – TCS ID: 7040-37045: Macedonian Railways Rolling Stock Renewal* Assistance to PIU for TS: Electric Locomotive GO Modernization (10/2012 – 07/2016) Client: / Funding: EBRD	International Project financed by European Bank for Reconstruction and Development / (10/2012 – 07/2016).

				Grant to MRT JSC Skopje / EBRD Grant, SubContractor: AECOM, London, Great Britain, Position: Freight Wagon Specialist. Team Leader and Electric Locomotives Maintenance Specialist	
		5.	Vrtanoski Gligorce (team leader):	Macedonian Railways Rolling Stock Renewal Project, EBRD Project No. 43997, (10/2012 – 03/2016) – TCS ID: 37045: Macedonian Railways Rolling Stock Renewal Project – Assistance to PIU for TS: Freight Wagon; Contract No.: C26160/AUS1-2013-03-03, Client: / Funding: EBRD Grant to MRT JSC Skopje / EBRD Grant, SubContractor: iC consulenten ZT GmbH, Vienna, Austria, Position: Freight Wagon Specialist.	International Project financed by European Bank for Reconstruction and Development / (10/2012 – 03/2016).
	10.3.	Printed books in the last five years (up to 5)			
		No.	Author	Title	Publisher/Year
		1.			
		2.			
		3.			
		4.			
		5.			
	10.4.	Printed professional papers in the last 5 years (up to 5)			
		No.	Author	Title	Publisher/Year
		1.	Georgi Hristov, Gligorche Vrtanoski	Establishing a National Regulator on water services in Macedonia: Watch what you wish	5th Biennial Conference on Regulatory Governance, June 25 – 27, 2014, Barcelona, Spain.
		2.	Igor Korunoski, Kire Dimanoski, Gligorche Vrtanoski	The Influence of the Railway Fleet Modernization on the Energy Efficiency	XVI Scientific-Expert Conference on the Railways RAILCON ’14, October 09-10, 2014, Nish, Serbia.
		3.	Gligorche Vrtanoski	WIPO Tool on Management of Academic Intellectual Property, Current Status of Teaching Intellectual Property at Higher Education Institutions	WIPO Inter-Regional Consulations, October 27-28, 2013, Budapest, Hungary.

		4.	Kire Dimanoski, Gordan Stojich, Gligorche Vrtanoski	Model for Measuring Quality of Railway Passanger Service	First International Conference „Transport for Today's Socienty“, Proceedings, May 19 – 21, 2016, pp 380-389, Bitola, Macedonia, UDC 656.2.025.2:005. 336.3(497.11)
		5.	Kire Dimanoski, Gordan Stojich, Gligorche Vrtanoski	Improving Quality of Railway Passanger Service in Republic of Macedonia	VIII International Scinetific Conference „Transport Problems 2016“, Proceedings, June 27 – 28, 2016, pp 100-106, Katowice, Poland, ISBN 978-83-935232-8-3

11.	Supervision (mentorship) of undergraduate, master and doctoral studies students		
	11.1.	Undergraduate	Over 50
	11.2.	Master	15
	11.3.	Doctoral	3

12. For mentors of doctoral thesis, selected work for the last four / five years

12.1. Proof of printed scientific papers in international scientific journals or international publications in the related field (up to 6) in the past five years

No.	Author	Title	Publisher/Year
1.			
2.			
3.			
4.			
5.			
6.			

12.2. Proof of at least two printed scientific papers in international scientific journals that have impact factor in the related field in the past five years

No.	Author	Title	Publisher/Year
1.			
2.			

12.3. Proof of at least three international meetings' participation in the past four years

No.	Author	Title	International Meeting/ Conference	Year
1.				
2.				
3.				

Add. 4	**Information about the teachers that lecture at the first, second and third study program and are mentors on the doctoral thesis**			
1.	Name(First, Last)	Zoran Pandilov		
2.	Date of birth	04.01.1965		
3.	Scientific degree/Title	VIII / Dr.		
4.	Title of the scientific degree	Doctor in Technical Sciences		
5.	Year and institution of the scientific degree	Education	Year	Institution
		B.Sc, in	1984-1989	Faculty of Mechanical

		Mechanical Engineering		Engineering-Skopje
		M.Sc. in Mechanical Engineering	1989-1993	Faculty of Mechanical Engineering-Skopje
		Dr. in Technical Sciences	1993-1997	Faculty of Mechanical Engineering-Skopje
6.	Area, field and particular specialty of master of science degree	Area	Field	Specialty
		Technical sciences	Mechanical engineering	Flexible automation
7.	Area, field and particular specialty of Doctoral degree	Area	Field	Specialty
		Technical sciences	Mechanical engineering	Flexible automation

8.	If employed, state the institution where he/she works and the title and area in which is named	Institution	Title and area
		University Ss. Cyril and Methodius, Faculty of Mechanical Engineering - Skopje	Full time Professor, Production technologies and systems

9. List of courses that the teacher is lecturing separately for first, second and third cycle

9.1. List of courses that the teacher is lecturing in the first cycle

No.	Course	Study program/Institution
1.	Automation in production	Production Engineering, Industrial Engineering and Management/ Faculty of Mechanical Engineering, University Ss. Cyril and Methodius-Skopje
2.	Numerical control and CAD/CAM	Production Engineering/ Faculty of Mechanical Engineering, University Ss. Cyril and Methodius-Skopje
3.	Industrial robotics	Production Engineering, Automation and control systems/ Faculty of Mechanical Engineering, University Ss. Cyril and Methodius-Skopje
4.	Numerically controlled machines	Production Engineering, Mechatronics / Faculty of Mechanical Engineering, University Ss. Cyril and Methodius-Skopje

9.2. List of courses that the teacher is lecturing in the second cycle

No.	Course	Study program/Institution
1.	Flexible Automation	Advanced manufacturing systems and technologies , Virtual manufacturing engineering,/ Faculty of Mechanical Engineering, University Ss. Cyril and Methodius-Skopje
2.	Modeling and simulation of physical systems	Advanced manufacturing systems and technologies /Faculty of Mechanical Engineering, University Ss. Cyril and Methodius-Skopje
3.	Numerically controlled machines and CNC programming	Advanced manufacturing systems and technologies , Virtual manufacturing engineering, Modeling and simulation of

				plastic deformation technologies and processes/ Faculty of Mechanical Engineering, University Ss. Cyril and Methodius-Skopje
		4.	CAD/CAM systems	Advanced manufacturing systems and technologies ,Modeling and simulation of plastic deformation technologies and processes,/Faculty of Mechanical Engineering, University Ss. Cyril and Methodius-Skopje
		5.	Virtual design of production systems and machines	Virtual manufacturing engineering/ Faculty of Mechanical Engineering, University Ss. Cyril and Methodius-Skopje
		6.	Systems for automation	Product life cycle management/Faculty of Mechanical Engineering, University Ss. Cyril and Methodius-Skopje
		7.	Automation of the process of measurement and control	Metrology, management and control of quality/ Faculty of Mechanical Engineering, University Ss. Cyril and Methodius-Skopje
		8.	Safety of machines and devices	Management with Occupational Safety and Health Systems / Faculty of Mechanical Engineering, University Ss. Cyril and Methodius-Skopje
	9.3.	List of courses that the teacher is lecturing in the third cycle		
		No.	Course	Study program/Institution
		1.	Numerical and program control of movements and processes	Mechanical Engineering / Faculty of Mechanical Engineering, University Ss. Cyril and Methodius-Skopje
		2.	Flexible automated machines, devices and production systems	Mechanical Engineering / Faculty of Mechanical Engineering, University Ss. Cyril and Methodius-Skopje
		3.	Selected chapters from robotics	Mechanical Engineering / Faculty of Mechanical Engineering, University Ss. Cyril and Methodius-Skopje
		4,	CAx technologies	Mechanical Engineering / Faculty of Mechanical Engineering, University Ss. Cyril and Methodius-Skopje
10.	Selected results in the past five years			
	10.1.	Relevant printed scientific papers (up to 5)		
		No.	Author	Title	Publisher/year
		1.	Z.Pandilov, V. Dukovski	Static and dynamic stiffness of the mechatronic position servo systems	Applied Mechanics and Materials Vol. 332 (2013) pp 186-193, Trans Tech Publications, Switzerland, ISBN-13: 978-3-03785-733-5, (ISSN: 1660-9336) (International journal)

		2.	Z.Pandilov, V. Dukovski	Improving the HSC linear motor milling machine contouring accuracy	Key Engineering Materials Vol. 581 (2014) pp 384-390, Trans Tech Publications, Switzerland, ISBN 978-3-03785-840-0, (ISSN: 1013-9826) (International journal)
		3.	Z.Pandilov, V. Dukovski	Comparison of the characteristics between serial and parallel robots	ACTA TECHNICA CORVINIENSIS-Bulletin of Engineering, Tome VII (Year 2014), Fascicule 1 (January-March), pp. 143-160, ISSN 2067-3809 (International journal)
		4.	Z.Pandilov, V. Dukovski	Analytical Determination of the CNC Machines High-Speed Feed Drives Position Loop Gain	Applied Mechanics and Materials Vol. 555 (2014) pp 505-510, Trans Tech Publications, Switzerland, ISSN: 1660-9336 (International journal)
		5.	Zoran Pandilov, Andrzej Milecki, Amadeusz Nowak, Filip Górski, Damian Grajewski,	Virtual modeling and simulation of CNC machine feed drive system	ANNALS of Faculty Engineering Hunedoara – International Journal of Engineering , Tome XIII [2015] – Fascicule 1 [February], pp. 19-28, ISSN: 1584-2665 (International journal)
	10.2.	Participation in scientific national and international projects (up to 5)			
		No.	Author	Title	Publisher/year
		1.	Igor Drstvensek, Zoran Pandilov, et all.:	Applications of Rapid Manufacturing in Biomedical Fields	(Central European Exchange Program for University Studies) CEEPUS III Program SI-0206 project:, (five years project 2010-2014). (International project) (Project leader from Macedonian side)
		2.	Robert Cep, Zoran Pandilov, et all.	Knowledge Bridge for Students and Teachers in Manufacturing Technologies	(Central European Exchange Program for University Studies) CEEPUS III Program CZ-0201 project, (four years project 2011-2014). (International project) (Project leader from Macedonian side)
		3.	Nicolae Ungureanu, Zoran Pandilov, et all.	Implementation and utilization of e-learning systems in study area of production engineering in Central European Region	(Central European Exchange Program for University Studies) CEEPUS III Program RO-0202 project, (twelve years project 2008-2019). (International project) (Project leader from

					Macedonian side)
		4.	M. Borzan, Z. Pandilov, et all.	"Teaching and Research of Environment-oriented Technologies in Manufacturing",	(Central European Exchange Program for University Studies) CEEPUS III Program RO-0013 project , (six years project 2014-2019). (International project) (Project leader from Macedonian side)
		5.	I. Mankova, Z. Pandilov, et all.	"ADVANCES IN MACHINING : skills and competencies for the future"	(Central European Exchange Program for University Studies) CEEPUS III Program SK-0067 project: (two years project 2016-2017). (Project leader from Macedonian side) (International project)
	10.3.	Printed books in the last five years (up to 5)			
		No.	Author	Title	Publisher/year
		1.	Zoran Pandilov	Automation	Faculty of Mechanical Engineering-Skopje, 2015, internal edition
		2.			
		3.			
	10.4.	Printed professional papers in the last 5 years (up to 5)			
		No.	Author	Title	Publisher/year
		1.	Amadeusz Nowak, Bartosz Minorowicz, Frederik Stefański, Zoran Pandilov	Characteristics of the Improved Magnetic Shape Memory Alloy Actuator Test Stand	R. Szewczyk et.al. (Eds.) Progress in Automation, Robotics and Measuring Techniques, Advances in Intelligent Systems and Computing Volume 350, 2015, pp 169-176, Springer International Publishing Switzerland 2015, ISBN 978-3-319-15795-5, ISSN 2194-5357
		2.	A. Naumov, Z. Pandilov	Benefits of implementation of flexible automation and CAD/CAM systems in metal processing companies	Mechanical Engineering – Scientific Journal, Vol. 33, No. 1, pp. 91–102 (2015), CODEN: MINSC5, In print: ISSN 1857–5293, On line: ISSN 1857–9191.
		3.	N. Veselinkovski, Z. Pandilov	Benefits of upgrading CNC machine for engraving and cleaning metal parts	Mechanical Engineering – Scientific Journal, Vol. 33, No. 1, pp. 103–108 (2015), CODEN: MINSC5, In print: ISSN 1857–5293, On line: ISSN 1857–9191
		4.	Z. Pandilov	Electrochemical machining of materials used in extreme conditions,	Proceedings of the Industrial Workshop "Innovations towards technology for extreme

					conditions industry", University of Burgos, October 5-7, 2016, Burgos, Spain
		5.	Betim Shabani, Zoran Pandilov	Analyzing and application of Reverse Engineering for design and development of mechanical parts	Mechanical Engineering – Scientific Journal, Vol.35 , No.2 , pp. 89-96 (2017), CODEN: MINSC5, In print: ISSN 1857–5293, On line: ISSN 1857–9191
11.	Supervision (mentorship) of undergraduate, master and doctoral studies students				
	11.1.	Undergraduate		Over 170	
	11.2.	Master		15	
	11.3.	Doctoral			
12.	For mentors of doctoral theses, selected papers for the last four/five years				
	12.1.	Proof of printed scientific research papers in international scientific journals or international scientific publications in the given field (up to six) in the last five years			
		No.	Author	Title	Publisher/year
		1.	Z.Pandilov, V. Dukovski	Static and dynamic stiffness of the mechatronic position servo systems,	Applied Mechanics and Materials Vol. 332 (2013) pp 186-193, Trans Tech Publications, Switzerland, ISBN-13: 978-3-03785-733-5, (ISSN: 1660-9336) (International journal)
		2.	Z.Pandilov, V. Dukovski	Improving the HSC linear motor milling machine contouring accuracy	Key Engineering Materials Vol. 581 (2014) pp 384-390, Trans Tech Publications, Switzerland, ISBN 978-3-03785-840-0, (ISSN: 1013-9826) (International journal)
		3.	Z.Pandilov, V. Dukovski	Comparison of the characteristics between serial and parallel robots	ACTA TECHNICA CORVINIENSIS-Bulletin of Engineering, Tome VII (Year 2014), Fascicule 1 (January-March), pp. 143-160, ISSN 2067-3809 (International journal)
		4.	Z.Pandilov, V. Dukovski	Analytical Determination of the CNC Machines High-Speed Feed Drives Position Loop Gain	Applied Mechanics and Materials Vol. 555 (2014) pp 505-510, Trans Tech Publications, Switzerland, ISSN: 1660-9336 (International journal)
		5.	Zoran Pandilov, Andrzej Milecki, Amadeusz Nowak, Filip Górski, Damian Grajewski	Virtual modeling and simulation of CNC machine feed drive system	ANNALS of Faculty Engineering Hunedoara – International Journal of Engineering , Tome XIII [2015] – Fascicule 1 [February], pp. 19-28, ISSN: 1584-2665 (International journal)
		6.	Z.Pandilov, V.	HSC linear motor machine	Applied Mechanics and

			Dukovski	dynamic stiffness,	Materials, Vol 772 (2015) pp 218-223 , Trans Tech Publications, Switzerland, ISSN: 1660-9336 (International journal)	
	12.2.	Proof of at least two printed scientific research papers in international scientific journals with impact factor in the given field in the last five years				
		No.	Author	Title	Publisher/year	
		1.	Z.Pandilov, V. Dukovski	Static and dynamic stiffness of the mechatronic position servo systems	Applied Mechanics and Materials Vol. 332 (2013) pp 186-193, Trans Tech Publications, Switzerland, ISBN-13: 978-3-03785-733-5, (ISSN: 1660-9336) (International journal)	
		2.	Z.Pandilov, V. Dukovski	Improving the HSC linear motor milling machine contouring accuracy	Key Engineering Materials Vol. 581 (2014) pp 384-390, Trans Tech Publications, Switzerland, ISBN 978-3-03785-840-0, (ISSN: 1013-9826) (International journal)	
	12.3.	Proof of at least three participation in international meetings in the last four years				
		No.	Author	Title	International meeting/conference	
		1.	Amadeusz Nowak, Bartosz Minorowicz, Frederik Stefański, Zoran Pandilov	Characteristics of the Improved Magnetic Shape Memory Alloy Actuator Test Stand	Proceedings of the Conference "Automation 2015", March 18 - 20, 2015, Industrial Institute for Automation and Measurements PIAP, Warsawa, paper 72,	2015
		2.	Z. Pandilov	Electrochemical machining of materials used in extreme conditions	Proceedings of the Industrial Workshop "Innovations towards technology for extreme conditions industry", University of Burgos, October 5-7, 2016, Burgos, Spain	2016
		3.	Zoran Pandilov	Electrochemical machining (tolerances, advantages and disadvantages)	Proceedings of the Workshop "Electrochemical processing methodologies and corrosion protection for	2016

					device and systems miniaturization", WG1, National Technical University Athens, October 12–14, 2016, Athens, Greece	

Add. 4	**Information about the teachers that lecture at the first, second and third study program and are mentors on the doctoral thesis**			
1.	Name (First, Last)	**Valentina Gecevska**		
2.	Date of birth	09.09.1965		
3.	Scientific degree / Title	Ph.D.		
4.	Title of the scientific degree	Ph.D. in Technical Sciences		
5.	Year and institution of the scientific degree	Education	Year	Institution
		Ph.D. in Mechanical Engineering	2002	Faculty of Mechanical engineering - Skopje
		M.Sc. in Mechanical Engineering	1995	Faculty of Mechanical engineering - Skopje
		B.Sc. in Mechanical Engineering	1989	Faculty of Mechanical engineering - Skopje
6.	Area, field and particular specialty of master of science degree	Area	Field	Specialty
		Technical Sciences	Mechanical engineering	Automation process planning and design
7.	Area, field and particular specialty of doctoral degree	Area	Field	Specialty
		Technical Sciences	Mechanical engineering	Production processes and technologies
8.	If employed, state the institution where he/she works and the title and area in which is named	Institution	Title and area	
		Ss. Cyril and Methodius University in Skopje, Faculty of Mechanical Engineering	Full time professor Production Engineering and Industrial Engineering	
9.	List of courses that the teacher is lecturing separately for first, second and third cycle			

9.1.	List of courses that the teacher is lecturing in the first cycle		
	No.	Course	Study program/institution
	1.	Process planning and design	Production Engineering
	2.	Engineering economics	Industrial engineering and management
	3.	Management of new product development	Industrial engineering and management
	4.	Production technologies	Mechanical Engineering

	9.2.	List of courses that the teacher is lecturing in the second cycle		
		No.	Course	Study program/institution
		1.	Advanced production processes and technologies	Production Engineering
		2.	Intelligent production systems	Production Engineering Industrial Negineering and Management
		3.	Automation process planning design	Production Engineering Industrial Negineering and Management
		4.	Basic of Product Lifecycle Management	Product Lifecycle Management
		5.	Economic of life cycle	Product Lifecycle Management
		6.	Environmental sustainability	Product Lifecycle Management
		7.	Innovation management	Product Lifecycle Management
		8.	Quality costs management	Quality Management
		9.	Processes management	Management of safety systems
		10.	Environmental Risk Management	Environmental Engineering
		11.	Management of technology and Management of new product development	Industrial engineering, Engineering management/Faculty of Technical Sciences in Novi Sad
	9.3.	List of courses that the teacher is lecturing in the third cycle		
		No.	Course	Study program/institution
		1.	Engineering economics analysis	Industrial Engineering and Management
		2.	Intelligent production systems and processes	Mechanical Engineering
10.	Selected work in the past five years			
	10.1.	Relevant scientific printed paper (up to 5)		
		No.	Author	Title	Publisher/year
		1.	Gecevska V., Anisic Z.	Lean Product Lifecycle Management Approach	Int. Journal of Industrial Engineering and Management, Vol.4 N.4, 2013, ISSN: 2217-2661, pp. 207-214. (Scimago SJR=0.2)
		2.	Petkovic D., Gecevska V., Madic M., Radovanovic M.	Application of the performance selection index method for solving machining MCDM problems	Scientific Journal Facta Universitatis, series Mechanical Engineering, Vol.12, No.12, 2014, ISSN: 0354-2025.
		3.	Gecevska V., Polenakovik R.	Mass Customization as Aided Value Tool in New Product Development Process	Int. Journal of Innovative Research in Science, Engineering and Technology, Vol.4, Issue 11, 2015, pp.346-355. ISSN 2319-8753. (Global IF=0,544 for 2015)
		4.	Gecevska V., Kuzinovski M., Cus F., Tomov M.	Modelling of Cutting Tool Wear and Cutting Tool Life for Face Milling Operations	Journal of the Balkan Tribological Association, Vol.22, No.3A-I, 2016. ISSN: 1310-4772.

					(WoS SCI journals, IF=0,32 for 2015)
		5.	Polenakovik R., Stankovska I., Jovanovski B., Gecevska V.	Innovativeness in Macedonian Companies: Evidence from the Community Innovation Survey	Journal of Technical Gazzette, Vol.25, No.3, 2018, pp.910-915. (WoS SCI journals, IF=0,5 for 2016)
	10.2.	Participation in scientific national and international projects (up to 5)			
		No.	Author	Title	Publisher/year
		1.	Gecevska V. – project coordinator for Macedonia, Cus F. – project coordinator for Slovenia	„Development of the intelligent based tools for production processes management"	International Scientific Project financed by the Ministry of Education and Science - Macedonia and the Ministry of Science and Technology-Slovenia,2012-2014
		2.	Gecevska V.-project coordinator	„Current assistance and lessons learned from international multilateral and bilateral donors in Republic of Macedonia"	World Bank Group, 2014
		3.	Gecevska V. – member of team	„The International Virtual Laboratory for Enterprise Interoperability – Network of Excellence for Networked Enterprise Applications and Software"	FP7 ICT, Contractor: University Bordeaux, France, Oct.2011-Oct.2015
		4.	Gecevska V. – coordinator for Circular Economy Chapter	„ Strengthening capacities and mechanisms for supporting Chapter 20 reform processes"	IPA Project, 2015-2018
		5.	Gecevska V. – project coordinator	IoT (Interent of Things) with PLM Application in Agricultural Industry	Macedonian – China bilateral scientific project, 2018-2019
	10.3.	Printed books in the last five years (up to 5)			
		No.	Author	Title	Publisher/year
		1.	Cus F., Gecevska V., Chiampo F.	METHOD AND TECHNIQUES FOR INDUSTRIAL DEVELOPMENT	Scientific Monograph, Publishers: Faculty of Mechanical Engineering, University of Maribor, Slovenia & Politecnico di Torino, Italy, September 2015, ISBN 978-961-248-493-4, 266 p.
		2.	Cus F., Chiampo F., Lombardi F., Gecevska V.	TOWARDS TECHNICAL EDUCATION ON RESOURCES SAVINGS FOR INDUSTRIAL	Scientific Monograph, Publishers: Faculty of Mechanical Engineering, University of Maribor,

				DEVELOPMENT	Slovenia & Politecnico di Torino, Italy, June 2015, ISBN 978-961-248-488-0, 224 p.
		3.	Cus F., Gecevska V.	„Development of Intelligent and Innovative Tools for Production Process Engineering and Sustainable Management	Scientific Monograph, Publisher: University of Maribor, Slovenia, ISBN 978-961-248-418-7, June 2013, 275 p.
		4.	Cus F., Gecevska V.	Advances in Production and Industrial Engineering	Scientific Monograph, Publisher: University of Maribor Press, Slovenia, ISBN 978-961-286-028-8, April 2017, COBISS.SI-ID 91546369, 252 p.
		5.			
	10.4	Printed professional papers in the last 5 years (up to 5)			
		No.	Author	Title	Publisher/year
		1.	Gecevska V. member of team	„Western Balkan Regional R&D Strategy for Innovation”	Strategy Document: financed by the World Bank and European Commission, 2013, 105p.
		2.	Gecevska V., etc.	„Value Stream Mapping analysis and improvement for the production process of electrical equipment	EuropeAid/127054/C/SER /Multi in third countries, Skopje, 2013, 75p.
		3.	Gecevska V., etc.	„Factors for Economic Growth of Macedonian SMEs”	World Bank, 2014, 155p.
		4.	Gecevska V.	„Economical Assessment and Cost Benefit Analysis for Production Plant based on Renewable Energy Sources”	Feasibility Study, FP7 CONCERTO - 239515 Project, 2014, 95p.
		5.	Gecevska V. etc.	„„BPM for software platform development of internal processes optimization in production company””	EuropeAid/127054/C/SER /Multi in third countries, Skopje, 2015, 75p.
11.	Менторства на додипломски, магистерски и докторски студии				
	11.1.	Дипломски работи	65		
	11.2.	Магистерски работи	20		
	11.3.	Докторски дисертации	4		
12.	За ментори на докторски трудови селектирани резултати во последните четири/пет години				
	12.1.	Доказ за печатени научноистражувачки трудови во меѓународни научни списанија или меѓународни научни публикации во даденото поле (до шест) во последните пет години			
		No.	Author	Title	Publisher/year

		1.	Petkovic D., Gecevska V., Madic M., Radovanovic M.	Application of the performance selection index method for solving machining MCDM problems	Scientific Journal Facta Universitatis, series Mechanical Engineering, Vol.12, No.12, 2014, ISSN: 0354-2025.
		2.	Madic M., Gecevska V., Radovanovic M., Petkovic D.	Multi-Criteria Economic Analysis of Machining Processes Using the WASPAS Method	Journal of Production Engineering, Vol.17, No.2, 2014, ISSN: 1821-4932, 79-82.
		3.	Jovanovski R.B., Gecevska V., Polenakovik R., Sutevski D., Stankovska I.	Business Model as a Success Factor for the Companies Growth	ANNALS of Faculty Engineering Hunedoara – International Journal of Engineering, Tome XIII [2015] – Fascicule 3, August 2015.
		4.	Gecevska V., Caloska J., Polenakovik R., Donev V., Jovanovski R. B.	Integration of Lean Principles and Safety Management System	Mechanical Engineering – Scientific Journal, Vol.33, No 3, 2015, ISSN 1857-5293, pp. 221-225.
		5.	Golcev V., Jovanoski B., Gecevska V., Minovski R.	KANBAN Simulation Model for Production Process Optimization	Journal of Engineering Management and Compettitiveness, Vol.5, No.2, 2015, ISSN: 2217-8147, pp.55-60.
		6.	Gecevska V., Donev V., Polenakovik R.	A Review of Environmental Tools towards Sustainable Development	ANNALS of Faculty Engineering Hunedoara – International Journal of Engineering, Vol.14, No.1, 2016, ISSN: 1584-2665.
	12.2.	Доказ за најмалку два печатени научноистражувачки трудови во меѓународни научни списанија со импакт фактор во даденото поле во последните пет години			
		v	Автори	Наслов	Издавач/година
		1.	Gecevska V., Kuzinovski M., Cus F., Tomov	Modelling of Cutting Tool Wear and Cutting Tool Life for Face Milling Operations	Journal of the Balkan Tribological

			M.		Association, Vol.22, No.3A-I, 2016, pp.3013-3025. ISSN: 1310-4772, Publ. SciBulCom Ltd. [Indexed in WoS SCI journals, IF=0,735]
		2.	Gecevska V., Donev V., Polenakovik R.	Mass Customization as Aided Value Tool in New Product Development Process	Int. Journal of Innovative Research in Science, Engineering and Technology, Vol.4, Issue 11, 2015, pp.346-355. ISSN 2319-8753. [Global IF=1,762 for 2015]

12.3. Доказ за најмалку три учества на меѓународни собири во последните четири години

No.	Author	Title	International meeting/conference	year
1.	Gecevska V.	Application of the Analytical Hierachy Process for Decision Making During Raw Material Selection Process	Proceedings of 7th International Conference of Management of Technology Step to Sustainable Production (MOTSP'2015), June 2015.	2015
2.	Gecevska V.	Product Lifecycle Management Concept as a Data Management Tool for Industry 4.0	International Scientific Conference Industry 4.0 (INDUSTRY 4.0 – 2016), December 2016.	2016
3.	Gecevska V.	Module Based Digital Structure of Management Information System	8th International Scientific Conference Mass Customization & Personalization - Comunity of Europe: Digitalization (MCP-CE 2018 Conference), September 2018.	2018

Add. 4	**Information about the teachers that lecture at the first, second and third study program and are mentors on the doctoral thesis**

1.	Name (First, Last)	Atanas Kochov		
2.	Date of birth	March 8, 1966		
3.	Scientific degree / Title	Doctor of Philosophy; Ph.D.		
4.	Title of the scientific	Ph.D. in Technical Sciences		
5.	Year and institution of the scientific degree	Education	Year	Institution
		Ph.D. in Mechanical	2001	Faculty of Mechanical engineering - Skopje
		M. Sc. in Mechanical	1994	Faculty of Mechanical engineering - Skopje
		B. Sc. in Mechanical	1990	Faculty of Mechanical engineering - Skopje
6.	Area, field and particular specialty of master of science degree	Area	Field	Specialty
		Technical & Technology sciences	Mechanical engineeri	Production engineering, technologies and systems FEA in metal forming
7.	Area, field and area of doctoral degree	Area	Field	Specialty
		Technical & Technological sciences	Mechanical engineering, Materials	Production engineering technologies and systems, organization of technological processes; Composite materials
8.	If employed, state the institution where he/she works and the title and area in which is named	Institution		Title and area
		UKIM, Faculty of Mechanical Engineering		Full time professor Mechanical engineering

9. List of courses that the teacher is lecturing separately for first, second and third cycle

9.1. List of courses that the teacher is lecturing in the first cycle

No.	Course	Study program/institution
1.	Management of technology	Industrial engineering and
2.	Computer aided engineering	Production engineering
3.	Production processes	Mechanical engineering
4.	Technology of rapid prototyping	Mechanical engineering
5.	3D engineering	Production engineering
6.	Technology of composites	Production engineering
7.	Technology of metal forming	Production engineering
8.	Modeling of injection molding tools	Production engineering
9.	Computer aided design of metal	Production engineering

9.2. List of courses that the teacher is lecturing in the second cycle

No.	Course	Study program/institution
1.	Management of technology	Industrial engineering and
2.	Sustainable development	Product life cycle management
3.	Cleaner production	Metrology
4.	Modeling and simulation of plastic injection molding	Production engineering
5.	Concurrent engineering	Industrial engineering and
6.	Finite Element Analysis in engineering practices	Production engineering

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		7.	Sustainable production and consumption	Industrial engineering and management
		8.	Eco-innovation	Modeling and simulation of
	9.3.	List of courses that the teacher is lecturing in the third cycle		
		No.	Course	Study program/institution
		1.	Sustainable development	Industrial engineering and
		2.	Management of Technology innovation	Industrial engineering and management
		3.	Theory of plasticity and experimental analysis of metal forming processes	Production engineering
		4.	Advanced computer aided technics in production systems	Production engineering

10.	Selected work in the past five years				
	10.1.	Relevant scientific printed paper (up to 5)			
		No	Author	Title	Publisher/year
		1.	A. Kochov, O. Tuteski, etc	Expert system for mold quotation,	International Journal for Technology of plasticity, Vol 40, Number 1, 2015
		2.	A. Kochov, O. Tuteski	Mold design and production by using additive manufacturing (AM) – present status and future perspectives	International scientific journal “Industry 4.0”, Sofia, Bulgaria, August 2018
		3.	A. Kochov, D. Mladenovska	Identification of technical indicators for creating natural gas supply policies–WBC’s	An enlargement and Integration action, EU Commission JRC, Vienna, Austria, December 2015
		4.	A.Kochov	Technology innovation for transition to low carbon economy: Path to sustainability	International conference on Energy, Renewables & Sustainability, Baku Azerbaijan, April, 2016
		5.	A. Kochov, F. Osmani	Definition of indicators for decision-making to contribute to sustainable development through Cleaner Production and Resource efficiency by using AHP methodology	Journal Energetika, Lithuania, November 2018
		6.	A.Kocov, Tuteski O., Spiroski Z	Analysis of the geometrical parameters and factors which define the complexity and the form of the mold	International Journal for Technology of plasticity, Vo. 39, Number 2, 2014
		7.	S.Cvetkov, A.Kocov:	Production of complex parts by deep drawing – deformation analysis,	International Journal for Technology of plasticity, Vol. 37, Number 1, 2012
		8.	S.Cvetkov, A.Kocov, Z. Spiroski:	Stress state in the process of deep drawing of sheet metal cover as a part of a clutch cover for commercial motor vehicles,	International Journal for Technology of plasticity, Vol. 37, Number 2, 2012
		9.	Cvetkov S., A.Kochov:	Experimental analysis for defining forming limit diagram for thick sheets	International Journal for Technology of plasticity, Vo. 39, Number 2, 2014

		10	S.Cvetkov, A.Kochov:	Experimental analysis for defining the curves of limit diagram for thick sheet metal	Journal for Technology of Plasticity, Vol. 40-2015/1, 2015
		11.	A.Kochov, L. Drakulevski	Challenges and opportunities for promoting technology transfer and Innovation in Western Balkan Countries	Book of Abstracts, published by: Ss Cyril and Methodius University, Faculty of Economics- Skopje, 2017
		12.	I.Lazarev, K.Kuzman, J.Mickovski, J.Lazarev, J.Chaloska, A.Kochov:	Metal matrix composites as tool material for deep drawing process,	Acta Technica Corviniensis, Tome V, Fascicule 3, September, 2012, ISSN 2067-3809
	10.2.	Participation in scientific national and international projects			
		No	Authors	Title	Publisher/Year
		1.	A.Kochov, etc.:	PRODE, Rapid prototyping technologies for sustainable development	University Donja Gorica, Podgorica, Montengero, World Bank project 2012-2017
		2.	A.Kochov, & others:	Low carbon technologies in SME's	UNIDO, 2012-2015, UEMCD
		3.	A.Kochov	LC economy in agro bussiness sector	2010-2013
		4.	A.Kocov (coordinator), P.Schwager	National Cleaner Production Technologies; UNIDO project	2007-2012
		5.	A.Kochov, etc	Chemical leasing – business model for WB	UNIDO, 2015-2018
		6.	A.Kochov etc.	Smart Specialization Strategy	EU & Macedonian Ministry for Education and Science, 2018
	10.3.	Printed books in past 5 years			
		No	Authors	Title	Publisher/Year
		1.	Атанас Кочов Atanas Kochov	Технологија на брзи прототипови, модели и алати Rapid prototyping, models and tools	УКИМ, 2015 UKIM, 2015
		2.	C. Kefol, M. Tekavcic, Lj.Drakulevski, A.Kochov:	Comparison of Telecommunications development patterns in China and the Republic of Macedonia, China- Central and Eastern Europe, Cross-Cultural Dialogue, Society, Business and Education in Transition,	Jagiellonian University Press, 2015
		3.	А.Кочов A.Kochov	Производни технологии, интерна скрипта Production technologies, internal script	МФС, 2012 MFS, 2012
		4.	Daniela	Chapter 12: Assessment of	© University of Maribor

			Mladenovska & Atanas Kochov	Alternatives for Natural Gas 171 Supply in Macedonia versus Technical Indicators	Press Advances in Production and Industrial Engineering: Scientific Monograph
		5.	Ognen Tuteski & Atanas Kochov	Chapter 9: Design Guidelines in Developing a Prototype 135 using Additive Manufacturing Methods	© University of Maribor Press Advances in Production and Industrial Engineering: Scientific Monograph
		6.	Atanas Kochov, Daniela Mladenovska	Energy Scenarios for SE Europe: A close look into the Western Balkans.	Proceedings of the Enlargement and Integration Actiion Workshop, JRC, Vienna, 2016 (pp.38-39). Editor JRC EU
	10.4.	Printed papers			
		No	Authors	Title	Publisher/year
		1.	A. Kochov etc.	National Cleaner Production Center Macedonia, Assesment for ceaner production technologies in Macedonian SME's	2007/2012
		2.	A. Kochov	Creating markets for research results	Milocher Development Forum, Przno, Montenegro, 2014
		3.	A. Kochov	Low Carbon technologies in Macedonian SME's from agro bussiness sector	2011- 2013
		4.	A. Kochov	Technology transfer princliples, case of Macedonia, WIPO Inter regional TTO meeting, Working together on Academic IP Commercialization in the region,	Metropolitan University Prague and Charles University, Prague, Prague, Czech Republic, September 2016
		5.	A. Kochov	Indicators for sustainable development of the company TeTo Skopje, feasibility study	December 2014
		6.	A. Kochov	Proof of concept in Macedonian SME's	Ispra, Italy, JRC, 2017
11.	Supervision (mentorship) of undergraduate, master and doctoral studies students				
	11.1.	Undergraduate		Over 25 candidates	
	11.2.	Master		Over 30 candidates	
	11.3.	Dotoral		7 candidates	
12.	For mentors of doctoral thesis, selected work for the last four / five years				
	12.1.	Proof of printed scientific papers in international scientific journals or international publications in the related field (up to 6) in the past five years			
		No	Authors	Title	Publisher/year
		1.	D.Gechevski, A.Kochov	Reverse logistics and green logistics way to improving the environmental sustainability	Acta Technica Corviniensis, Tome IX, Fascicule 1, January, 2016, ISSN 2067-3809
		2.	F.Osmani, A.Kochov	The importance of the teamwork in managing engineering projects with energy profiles	International Multidisciplinary Scientific Geo Conference SGEM

					2016, DOI:10.5593/SGEM2016/B42/S19.082, Book 4 Vol 2, 639-646 pg, July 2016
		3.	F.Osmani, A.Kochov	The Sustainable supply of thermal energy, planning and decision making by using analytic hierarchy process	17th International Multidisciplinary scientific Geo Conference SGEM 2017, proceedings, Vol 17th; Ecology, economics, education and legislation, issue 53, 2017
		4.	Kocov A, Tuteski O., Spiroski Z	Expert system for mold quotation,	International Journal for Technology of plasticity, Vol 40, Number 1, 2015
		5.	Ognen Tuteski, Atanas Kočov, Taško Rizov	New product design development based on additive manufacturing & rapid Prototyping methodology	International Journal for Technology of plasticity, Vol 40, Number 2, 2015
		6.	Atanas Kochov Ognen Tuteski Zoran Spiroski	Analysis of the geometrical parameters and factors which define the complexity and the form of the mold	Journal for Technology of Plasticity, Vol. 39-2014/2
		7.	S.Cvetkov, A. Kochov	Experimental analysis for defining the curves of limit diagram for thick sheet metal, part 2,	Journal for Technology of Plasticity, Vol. 39-2014/2
		8.	Slavco Cvetkov, Atanas Kochov, Zoran Spiroski	Stress state in the process of deep drawing of sheet metal cover as a part of a clutch cover for commercial motor vehicles	Journal for Technology of Plasticity, Vol. 37-2012/2
		9.	S.Cvetkov A.Kochov	Production of complex parts by deep drawing - deformation analysis	Journal for Technology of Plasticity, Vol. 37-2012/1
		10.	N.Kormushska, A.Kochov etc.	Complementary and Overlapping among Energy Performance Indicators as Part of the Sustainable Development and RECP Indicators in Cement Industry	International Journal of Contemporary ENERGY, Vol. 1, No. 1 , pp 20 – 26, ISSN 2363-6440, 2015.
	12.2.	Proof of at least two printed scientific papers in international scientific journals that have impact factor in the related field in the past five years			
		No	Authors	Title	Publisher/Year
		1.			
		2.			
	12.3.	Proof of at least three international meetings' participation in the past four years			

No.	Authors	Title	International conference	Year

1.	**Kochov A.,** Mladenovska D.,	Identification of technical indicators for creating natural gas supply policies – Balkan case	Invited lecture for the European Commission JRC & the Energy Community Secretariat Joint Workshop on Energy Scenarios for South Eastern Europe, Vienna	15 Dec, 2015
2.	D. Mladenovska, A. Kochov:	Identification of technical indicators for creating natural gas supply policies – Macedonian case	Industrial Energy and Environmental Protection in Southeast Europe, IEEP, Zlatibor, Serbia,	June, 2015
3.	F.Osmani, A.Kochov:	Case study – the importance and the impact of the cogeneration project in reducing atmospheric emissions in the city of Prishtina,	XII-371, ISSN 1822-7554, the 13th International conference of young scientists on energy issues, Kaunas, Lithuania,	May 26-27, 2016
4.	A.M.Lazarevska, N.Bakreska-Kormushoska, A.Kochov:	Complementarity and overlapping among energy performance indicators as part of the sustainable development and RECP indicators in cement industry,	5th International conference REMOO 2015, Budva, Montenegro,	Sep 2015
5.	A.M.Lazarevska, D.Mladenovska, A.Kochov:	Multi Criteria Assessment of natural gas supply options – the Macedonian case,	5th International conference REMOO 2015, Budva, Montenegro, September 2015	Sep 2015
6.	A. Kochov:	Challenges for food processing industry: New innovations & Ecosystems",	International Conference on Technology innovation in food processing industry, IQS & DNV.GL- Croatia, Skopje, Macedonia,	Dec 6, 2016
7.	S.Kjosevski, A.Kochov etc.	Determination of indicators for sustainable introduction of electric vehicles based on transportation system structure	JUMV the 26 th International Automotive Conference SCIENCE AND MOTOR VEHICLES in Belgrade	19-20 April 2017
8.	S. Kjosevski, A. Kochov etc.	Risks and safety issues related to use of electric and hybrid vehicles	MTM_Borovets_Bulgaria_2017	May 2017

9.	S. Kjosevski, A. Kochov	Sustainable development of road transport through Introduction of electric vehicles – initial study for Developing regions	1st International Conference towards sustainable development (TSD 2017) Sustainable development in Western Balkans: approaches, short-comings and challenges; Book of abstracts 1st Conference	SKOPJE, UMT, 2018
10.	S. Kjosevski, A. Kochov	MCDM for defining indicators for implementing e-vehicles in WBC's for environmental sustainability	Humboldt Kollege, Belgrade, Serbia	Sep 2018

Add. 4	**Information about the teachers that lecture at the first, second and third study program and are mentors on the doctoral thesis**			
1.	Name (First, Last)	Jasmina Chaloska		
2.	Date of birth	September 3, 1963		
3.	Scientific degree / Title	Ph.D.		
4.	Title of the scientific degree	Ph.D. in Technical Sciences		
5.	Year and institution of the scientific degree	Education	Year	Institution
		Ph.D. in Technical Sciences	2002	Faculty of Mechanical engineering – Skopje
		M. Sc. in Mechanical Engineering	1993	Faculty of Mechanical engineering – Skopje
		B. Sc. in Mechanical Engineering	1987	Faculty of Mechanical engineering – Skopje
6.	Area, field and particular specialty of master of science degree	Area	Field	Specialty
		Technical sciences	Mechanical engineering	Production engineering, technologies and systems
7.	Area, field and area of	Area	Field	Specialty
	Doctoral degree	Technical sciences	Mechanical engineering	Production engineering, technologies and systems
8.	If employed, state the institution where he/she works and the title and area in which is named	Institution	Title and area	
		UKIM, Faculty of Mechanical Engineering	Full time professor Mechanical engineering	
9.	List of courses that the teacher is lecturing separately for first, second and third cycle			
	9.1. List of courses that the teacher is lecturing in the first cycle			

		No.	Course	Study program/institution
		1.	Ergonomics	Industrial engineering and management
		2.	Business informatics	Production informatics
		3.	Unconventional manufacturing processes	Production engineering
		4.	Modeling of plastic deformation tools	Production engineering
	9.2.	List of courses that the teacher is lecturing in the second cycle		
		No.	Course	Study program/institution
		1.	Modern technologies of plasticity and tools	Production engineering
		2.	Safety and health systems	Product life cycle management
		3.	Professional risk management	Management of safety and health systems
		4.	Modeling and simulation of plastic deformation technologies	Production engineering
	9.3.	List of courses that the teacher is lecturing in the third cycle		
		No.	Course	Study program/institution
		1.	New materials and modern manufacturing processes	Mechanical engineering
		2.	Safety and risks at work	Industrial engineering and management

10.	Selected work in the past five years				
	10.1.	Relevant scientific printed paper (up to 5)			
		No.	Author	Title	Publisher/year
		1.	T. Pepeljak, J. Chaloska	*Process Parameteres Influencing Deformation Work of Deep Drawing of a Squared Box*	International Conference on Innovative Technologies IN-TECH 2014, Leiria, Portugal, 10-13.09.2014
		2.	I. Ajdari, J. Chaloska	*Impact of sustainable global prevention strategy for high-risk industrial sectors-Vision Zero*	XX World Congress on Safety and Health at Work, 24-27 August, Frankfurt, Germany, 2014
		3.	J. Chaloska, Lj. Dudeski, T. Velkovski	*The occupational safety expert as a basis for implementation and sustainability of OHS system*	International Conference for Regional Collaboration, Bled,
		4.	B. Matevska, J. Chaloska	*Model for safety increasing and risk assessment while working with hazardous chemicals*	International Conference on Innovative Technologies, IN-TECH 2017, Ljubljana, Slovenia 13-15.09.2017

	5.	I. Catik, J.Chaloska, D. Godec, M.Kovacik. A. Pilipovik, K. Skala	*Fluid-deposition of rocks is natural model for additive production*	Interdisciplinary Description of Complex Systems 15(3), 180-189, 2017 (Web of Science) SCI (Science Citation Index) journals IF=0,16]
10.2.	Participation in scientific national and international projects (up to 5)			
	No.	Author	Title	Publisher/year
	1.	J Caloska (project coordinator) Plazma, SolarTubes-Macedonia, Gorenje-Slovenia, AiTiip-Spain	Systems for assessment of surface integrity	EUREKA project, E!4133, 2007-2010
	2.	J Caloska (project coordinator), Arcelor Mittal, Rade Koncar TEP-Macedonia,Gorenje, LIV-Slovenia	Innovative eco-friendly processing of volumetric sheet metal components	EUREKA project, E!5783, 2010-2013
	3.	J. Chaloska... member of Macedonian team from University Ss.Cyril and Methodius	Increasing capacities and strengthening the role of regional CSOs for improving labor conditions and labor dialogue with public institutions	International project financed by EU 2016-2019
10.3.	Printed books in the last five years (up to 5)			
	No.	Author	Title	Publisher/year
	1.	R. Polenakovikj, J. Chaloska, B. Naumovska	Ergonomics	National Center for Development of Innovation and Entrepreneurship, 2012
10.4.	Printed professional papers in the last 5 years (up to 5)			
	No.	Author	Title	Publisher/year
	1.	T. Velkovski, P. Spasov, J. Chaloska, Lj. Dudeski	*Analysis of the Occupational safety system in opencast mines*	11 International Conference for Improvement of Safey and Health Systems, Prolom Banja, R. Serbia, 2014

		2.	A. Angelovska. J. Chaloska, V. Gecevska	*Exploring the impact of economic instruments in the field of OSH*	International Conference for Regional Collaboration OSH BON TON, Ohrid, R. Macedonia, 29-31.10. 2015
		3.	G. Zivcevski, J. Chaloska, A. Angelovska	*Methodologies for risk assessment of the workplace and proper selection criteria*	International Conference for Regional Collaboration OSH BON TON, Ohrid, R. Macedonia, 29-31.10. 2015
		4.	J. Chaloska	*Profile of the experts for safety at work - experiences from RM*	Center for Safety and Health at Work, Sofia, R.Bulgaria, 26.02.2016
		5.	J. Chaloska, T. Velkovski, M. Ivanov	*Records as a basis for sustainability of the systems for OSH*	Second Macedonian Congress on Occupational Health with international participation, Skopje, 12-14.10.2016

11.	Supervision (mentorship) of undergraduate, master and doctoral studies students		
	11.1.	Undergraduate	42
	11.2.	Master	18
	11.3.	Doctoral	2 in progress

12.	For mentors of doctoral thesis, selected work for the last four / five years				
	12.1.	Proof of printed scientific papers in international scientific journals or international publications in the related field (up to 6) in the past five years			
		No.	Author	Title	Publisher/year
		1.	M. Mitrevska, J. Chaloska, D. Gechevski	*Corporate Social Responsibility Approach for Sustainable Business Model*	Towards Technical Education on Resource Savings for Industrial Development University of Maribor, Maribor, Slovenia, 2015 Politecnico di Torino, Turin, Italy, 2015
		2.	V. Filiposki, J. Chaloska	*Analysis of Injection Molding Cooling Systems and Effects on the Ejection Time of the Part at*	Journal for Technology of Plasticity, vol.40, Novi Sad, R. Serbia, 2015

				Thermoplastic Injection Molding		
		3.	T. Velkovski, J. Chaloska, Lj. Dudeski	*Model of Semi-Quantitative Risk Assessment for Safety at Work in Manufacturing Industry*	Mechanical Engineering Scientific Journal, Vol.33, No.1, Skopje, R. Macedonia, 2015	
		4.	J. Chaloska, Lj. Dudeski, T. Velkovski	*Overview of the Macedonian Situation in the Field of OHS and Future Recommendations*	International Journal of Engineering, ISSN:1584-2673, Tome XIII, Hunedoara, Romania, august, 2015	
		5.	I. Catik, J.Chaloska, D. Godec, M.Kovacik. A. Pilipovik, K. Skala	*Fluid-deposition of rocks is natural model for additive production*	Interdisciplinary Description of Complex Systems 15(3), 180-189, 2017 (Web of Science) SCI (Science Citation Index) journals IF=0,16]	
		6.	V. Mucenski, I.Pesko, T. Velkovski, J. Chaloska, A. Vujkov, D. Bibic	*Impact of Construction Machinery and Tools on Non-Fatal Injuries in the Building Processes*	Tehnicki Vjesnik, ISSN 1330-3651, 2019 Slavonski brod, Croatia IF=0,686	
	12.2.	Proof of at least two printed scientific papers in international scientific journals that have impact factor in the related field in the past five years				
		No.	Author	Title	Publisher/year	
		1.	I. Catik, J.Chaloska, D. Godec, M.Kovacik. A. Pilipovik, K. Skala	*Fluid-deposition of rocks is natural model for additive production*	Interdisciplinary Description of Complex Systems 15(3), 180-189, 2017 (Web of Science) SCI (Science Citation Index) journals IF=0,16]	
		2.	V. Mucenski, I.Pesko, T. Velkovski, J. Chaloska, A. Vujkov, D. Bibic	*Impact of Construction Machinery and Tools on Non-Fatal Injuries in the Building Processes*	Tehnicki Vjesnik, ISSN 1330-3651, 2019 Slavonski brod, Croatia IF=0,686	
	12.3.	Proof of at least three international meetings' participation in the past four years				
		No.	Author	Title	International meeting/conference	year
		1.	J. Chaloska, Lj. Dudeski, T. Velkovski	*The occupational safety expert as a basis for implementation and sustainability of OHS system*	International Conference for Regional Collaboration, Bled, Slovenia	10-11.11.2016
			J. Chaloska,		International	26-31.10.2017

			T. Velkovski, M. Petkovski, M. Aleksevska		Conference for Regional Collaboration, BUILDING OSH IN 21st CENTURY, Budva, Montenegro	
		3.	J. Chaloska, M. Petkovski, T. Velkovski, S. J. Petkovska	*How to make functional osh system?*	Continuous Education- the Basis of Improving of Occupational Safety 15th International Conference, Kladovo, R. Serbia	*18-22.09.2018*

Add. 4	**Information about the teachers that lecture at the first, second and third study program and are mentors on the doctoral thesis**			
1.	Name (First, Last)	**Robert Minovski**		
2.	Date of birth	20.11.1964		
3.	Scientific degree / Title	Ph.D.		
4.	Title of the scientific degree	Ph.D. in Technical Sciences		
5.	Year and institution of the scientific degree	Education	Year	Institution
		PhD in Technical Sciences	1999	Faculty of Mechanical
		M.Sc. in Mechanical Engineering	1994	Faculty of Mechanical engineering - Skopje
		B.Sc. in Mechanical Engineering	1989	Faculty of Mechanical engineering - Skopje
6.	Area, field and particular specialty of master of science degree	Area	Field	Specialty
		Technical sciences	Mechanical Engineering	
7.	Area, field and area of doctoral degree	Area	Field	Specialty
		Technical sciences	Industrial Engineering and Management	
8.	If employed, state the institution where he/she works and the title and area in which is named	Institution		Title and area
		UKIM, Faculty of Mechanical Engineering		Full time professor Mechanical engineering
9.	List of courses that the teacher is lecturing separately for first, second and third cycle			
	9.1. List of courses that the teacher is lecturing in the first cycle			
	No.	Course	Study program/institution	
	1.	Design of Information Systems	Industrial Engineering and Management	
	2.	Management of Information	Industrial Engineering and Management	

		3.	Work Study	Industrial Engineering and Management
		4.	Production Systems	Industrial Engineering and Management
	9.2.	List of courses that the teacher is lecturing in the second cycle		
		No.	Course	Study program/institution
		1.	Business Information Systems	Industrial Engineering and Management
		2.	Restructuring of Organizations	Industrial Engineering and Management
		3.	Contemporary Production Systems	Industrial Engineering and Management
		4.	Motivation and Compensation Systems	Industrial Engineering and Management
	9.3.	List of courses that the teacher is lecturing in the third cycle		
		No.	Course	Study program/institution
		1.	Performance Measurement Systems	Industrial Engineering and Management
		2.	Integrated Quality Management processes	Industrial Engineering and Management
		3.	Approaches for modeling and Simulation of	Industrial Engineering and Management
		4.	Managerial production philosophies	Industrial Engineering and Management
10.	Selected work in the past five years			
	10.1.	Relevant scientific printed paper (up to 5)		

No.	Author	Title	Publisher/year
1.	B. Jovanoski, R. Minovski, S. Voessner and G. Lichtenegger	Managing strategy and production through hybrid Simulation	Journal of Industrial Management & Data Systems 113(8): 1110-1132/2013
2.	B. Jovanoski, R. Minovski, D. Jovanoski	Modelling and Simulation of Business Processes: Review and Recommendations	Development of Intelligent and Innovative Tools for Production Process Engineering and Sustainable Management, Scientific Monography, Chapter 8, p.p. 81-96, Maribor-Skopje/2013
3.	B. Jovanovski, R. Minovski, S. Voessner and G. Lichtenegger	Combining system dynamics and discrete event simulations - overview of hybrid simulation models	Journal of Applied Engineering Science, Vol. 10 No. 3, pp. 135–142/2013
4.	S. Srebrenkoska, A. Kochov, R. Minovski	Six sigma and design of experiments for improving the production of composite pipes	Journal for Technology of Plasticity, Vol. 41(2016), Number 2, pp.11-18
	Ž. Kotevski, B. Jovanoski, R. Minovski	Simulation model for improved production planning and control through quality, cycle time and batch size management	Journal of Engineering Management and Competitiveness, Vol. 5, No. 1, 2015, pp. 40-45

	5.	B. Jovanoski, R. Minovski, S. Voessner and G. Lichtenegger	Managing strategy and production through hybrid Simulation	Journal of Industrial Management & Data Systems 113(8): 1110-1132/2013
10.2.	Participation in scientific national and international projects (up to 5)			
	No.	Author	Title	Publisher/year
	1.	R. Minovski et al.	Joint Simulation Model for Strategic Decision Support	Macedonian-Austrian bilateral scientific project / 2011-2013
	2.	R. Minovski et al.	Adaptation of different simulations models for certain functional needs	University of Ss. Cyril and Methodius in Skopje/2012-2013
	3.	M. Klarin, R. Minovski et al.	Development of Stochastic Model for Determination of the Elements of the Working Time of the Production Cycle and their Optimization for Batch Production in the Metalworking Industry and Recycling Processes	Ministry of Science and Technological Development of Serbia / 2011-
10.3.	Printed books in the last five years (up to 5)			
	No.	Author	Title	Publisher/year
	1.	Р. Миновски	Менаџмент информациски	УКИМ / во печат
		Р. Миновски	Виртуелна фирма	Поглавје во книгата „Како до сопствен бизнс“, второ издание, УКИМ-БСЦ принт, стр. 301-324/2012
		Р. Миновски, Б. Јованоски	PLM Информациски системи	Машински факултет, Скопје, интерна скрипта / 2012
10.4.	Printed professional papers in the last 5 years (up to 5)			
	No.	Author	Title	Publisher/year
	1.	B. Jovanoski, R. Polenakovik, V. Gecevska, R. Minovski	Applying a suitable simulation approach for processes on different management levels	Proceedings of 16th Industrial Systems Conference pp. 327-333 / 2014
	2.	Stanisavljev, S., Stojanovic, Z., Minovski, R., Jovanoski, B., & Zakin, M	The Elements of production cycle time in serial production	9th International Multidiciplinary Scientific Conference - EUROBRAND, Zrenjanin, Serbia / 2014

		3.	M. Stanojeska, R. Minovski and B. Jovanoski	Employee Motivation as an Initiator In Improving the State of QMS – Literature Review	International Conference on Innovative Technologies IN-TECH 2016, pp. 67-71/2016, Prague, Chech Republic
		4.	Stanojeska, M., Minovski, R., Sajfert, Z., Ćoćkalo, D., Stanisavljev, S., Jovanoski, B.	Employees Motivation and Transition OF ISO 9001 QMS Towards TQM	6th International Symposium on Industrial Engineering - SIE, Belgrade, Serbia / 2015
		5.	Stanojeska, M., Minovski, R., Jovanoski, B.	Management Role in Improving the State Of QMS through Managing of Employee Motivation	VI International Symposium Engineering Management and Competitiveness 2016 (EMC 2016), Kotor, Montenegro

11.	Supervision (mentorship) of undergraduate, master and doctoral studies students		
	11.1.	Undergraduate	Over 20
	11.2.	Master	Over 10
	11.3.	Doctoral	3

12.	For mentors of doctoral thesis, selected work for the last four / five years				
	12.1.	Proof of printed scientific papers in international scientific journals or international publications in the related field (up to 6) in the past five years			
		No.	Author	Title	Publisher/year
		1.	B. Jovanoski, R. Minovski, S. Voessner and G. Lichtenegger	Managing strategy and production through hybrid simulation	Journal of Industrial Management & Data Systems 113(8): 1110-1132/2013
		2.	Lj. Gjergjeska, V. Gecevska, R. Minovski	Application of Artificial Neural Networks for Improving Contemporary Business Systems	Development of Intelligent and Innovative Tools for Production Process Engineering and Sustainable Management, Scientific Monography, Chapter 10, p.p. 110-131, Maribor-Skopje/2013
		3.	B. Jovanoski, R. Minovski, D. Jovanoski	Modelling and Simulation of Business Processes: Review and Recommendations	Development of Intelligent and Innovative Tools for Production Process Engineering and Sustainable Management, Scientific Monography, Chapter 8, p.p. 81-96, Maribor-Skopje/2013

	4.	S.Stanisavljev, D. Ćoćkalo, D. Đorđević, R. Minovski	The production cycle time in serial production: reduction of the duration in metal processing industry case	Journal of Applied Engineering Science, 2013, vol. 11, No. 3, pp. 115-122 / 2013
	5.	D. Ćoćkalo, D. Đorđević, S. Bogetić, D. Sajfert, R. Minovski	Quality of Business, Entrepreneurship Education and Business start up Intentions Among Students in Serbia: Research Results	Journal "Industrija", Vol.41, No.3, pp. 135-145 / 2013
	6.	B. Jovanoski, R. Minovski, D. Jovanoski	Modelling and Simulation of Business Processes: Review and Recommendations, Development of Intelligent and Innovative Tools for Production Process Engineering and Sustainable	Scientific Monography, Chapter 8, p.p. 81-96, Maribor-Skopje / 2013

12.2. Proof of at least two printed scientific papers in international scientific journals that have impact factor in the related field in the past five years

No.	Author	Title	Publisher/year
1.	B. Jovanoski, R. Minovski, S. Voessner and G. Lichtenegger	Managing strategy and production through hybrid simulation	Journal of Industrial Management & Data Systems 113(8): 1110-1132/2013
2.	B. Jovanovski, R. Minovski, D. Jovanoski	Assessment of the Press Replacement Using Simulation	Journal for Technology of Plasticity, Vol. 37 (2012), Number 2, pp. 161-171/2012
3.	D. Jovanoski, R.Minovski, G. Kostovska, B. Jovanovski	Modeling & Simulation as Tools for Optimisation of Material Flow in Production Systems	Journal for Technology of Plasticity, Vol. 37 (2012), Number 1, pp. 23-34/2012
4.	R. Minovski, B. Jovanoski, P. Galevski	Lean implementation and implications: experiences from Macedonia	International Journal of Lean Six Sigma (accepted for publishing)

12.3. Proof of at least three international meetings' participation in the past four years

No.	Author	Title	International meeting/conferenc	year
1.	M. Stanojeska, R. Minovski and B. Jovanoski	Employee Motivation as an Initiator In Improving the State of QMS – Literature Review	International Conference on Innovative Technologies IN-TECH 2016, pp. 67-71/2016, Prague, Chech Republic	2016

		2.	B. Jovanoski, R. Minovski, G. Lichtenegger, S. Voessner	Hybrid modeling of strategy and production in the manufacturing industry - taking the best from system dynamics and discrete event simulation	In M. Klumpp, ed. Proceedings of the 2012 European Simulation and Modelling Conference. Essen, Germany, Oct. 22- 24: EUROSIS, pp. 274-282	2012
		3.	Mucha, B. Jovanoski, R. Minovski, V. Gechevska	Simulation Module For Production Planning And Control	Proceedings of the II International Scientific Conference, High Technologies, Business, Society, pp., 171-174	2017

Add. 4	**Information about the teachers that lecture at the first, second and third study program and are mentors on the doctoral thesis**			
1.	Name (First, Last)	Dushan Chakmakov		
2.	Date of birth	February 18, 1959		
3.	Scientific degree / Title	Ph.D.		
4.	Title of the scientific degree	Ph.D. in Technical Sciences		
5.	Year and institution of the scientific degree	Education	Year	Institution
		Ph.D in Computer	1992	Faculty of Electrical
		M. Sc. in Computer Science	1987	Faculty of Electrical engineering - Skopje
		B. Sc. in Mathematics and Informatics	1982	Faculty of Mathematics - Skopje
6.	Area, field and particular specialty of master of science degree	Area	Field	Specialty
		Natural Sciences and Mathematics	Informatics	Programming Languages
7.	Area, field and area of doctoral degree	Area	Field	Specialty
		Technical sciences	Computer Science	Multimedia Systems and Information
8.	If employed, state the institution where he/she works and the title and area	Institution	Title and area	
		UKIM, Faculty of Mechanical Engineering	Full time professor Informatics and Mathematics	

9.	List of courses that the teacher is lecturing separately for first, second and third cycle			
	9.1.	List of courses that the teacher is lecturing in the first cycle		
		No.	Course	Study program/institution
		1.	Probability and Statistics	Industrial engineering and management
		2.	Programming	All
		3.	Structural Programming	Mechatronics
		4.	Databases	Industrial engineering and management
	9.2.	List of courses that the teacher is lecturing in the second cycle		
		No.	Course	Study program/institution
		1.	Selected Topics in Informatics	All

		2.	System Software	Mechatronics	
		3.	Advanced Computer Programming	Mechatronics	
	9.3.	List of courses that the teacher is lecturing in the third cycle			
		No.	Course	Study program/institution	
		1.	Advanced Topics in Informatics	All	

10.	Selected work in the past five years				
	10.1.	Relevant scientific printed paper (up to 5)			
		No.	Author	Title	Publisher/year
		1.	Celakoska E., Chakmakov D., Petrushevski M.	On Parameterization of Lorentz Boost Links	International Journal of Contemporary Mathe-matical Sciences, Vol. 10, 2015, no. 2, 85 – 90.
		2.	Celakoska E., Celakoska Jordanova V., Chakmakov D.	SO(3,C) Representation an d Actionon a Homogeneous Space in C^3	Communications in Mathem atics and Applications, 9(4), 2018, 115-122.
		3.	Celakoska E., Chakmakov D.	On Complex Vectors in C^3 with Real Valued Scalar Product	Theoretical Mathematics and Applications 8(3), 1-6.
		4.			
	10.2.	Participation in scientific national and international projects (up to 5)			
		No.	Author	Title	Publisher/year
	10.3.	Printed books in the last five years (up to 5)			
		No.	Author	Title	Publisher/year
		1.	Chakmakov D.	Probability and Statistics for Engineering	University ss. Cyril and Methodius, 2015
	10.4.	Printed professional papers in the last 5 years (up to 5)			
		No.	Author	Title	Publisher/year
		1.			
		2.			
		3.			
		4.			
		5.			
11.	Supervision (mentorship) of undergraduate, master and doctoral studies students				
	11.1.	Undergraduate		1	
	11.2.	Master			
	11.3.	Doctoral			
12.	For mentors of doctoral thesis, selected work for the last four / five years				
	12.1.	Proof of printed scientific papers in international scientific journals or international publications in the related field (up to 6) in the past five years			
		No.	Author	Title	Publisher/year

		1.			
	12.2.	Proof of at least two printed scientific papers in international scientific journals that have impact factor in the related field in the past five years			
		No.	Author	Title	Publisher/year
		1.			
	12.3.	Proof of at least three international meetings' participation in the past four years			
		No.	Author	Title	International meeting/conference / year
		1.			

Add. 4	**Information about the teachers that lecture at the first, second and third study program and are mentors on the doctoral thesis**			
1.	Name (First, Last)	Aleksa Malcheski		
2.	Date of birth	March 13, 1964		
3.	Scientific degree / Title	Ph.D.		
4.	Title of the scientific degree	Ph.D. in Mathematical Sciences		
5.	Year and institution of the scientific degree	Education	Year	Institution
		Ph.D in Mathe-mathical	2002	Faculty of Natural Sciences and
		M. Sc. in Mathe-mathical Science	1996	Faculty of Natural Sciences and
		B. Sc. in Mathematics	1988	Faculty of Natural Sciences and
6.	Area, field and particular specialty of master of science degree	Area	Field	Specialty
		Natural Sciences and Mathematics	Mathematics	Complex and Functional Analysis
7.	Area, field and area of doctoral degree	Area	Field	Specialty
		Natural Sciences and Mathematics	Mathematics	Functional Analysis
8.	If employed, state the institution where he/she works and the title and area	Institution		Title and area
		UKIM, Faculty of Mechanical Engineering		Full time professor Mathematics

9.	List of courses that the teacher is lecturing separately for first, second and third cycle			
	9.1.	List of courses that the teacher is lecturing in the first cycle		
		No.	Course	Study program/institution
		1.	Mathematics 1	All
		2.	Mathematics 2	All
		3.	Applied Optimization	Mechatronics
	9.2.	List of courses that the teacher is lecturing in the second cycle		
		No.	Course	Study program/institution
		1.	Selected Topics in Applied Mathematics	All
		2.	Selected Topics in Engineering	Mechatronic Systems
		3.	Optimization Methods	Mechatronic Systems
	9.3.	List of courses that the teacher is lecturing in the third cycle		
		No.	Course	Study program/institution
		1.	Advanced Topics in Applied Mathematics	All
10.	Selected work in the past five years			

10.1.	Relevant scientific printed paper (up to 5)			
	No.	Author	Title	Publisher/year
	1.	Malcheski, S., Anevska, K., Malcheski, A.	New fixed point theorems for T_f type contractive conditions in 2-Banach spaces	Matematički bilten, Vol. 42,No. 1, pp. 57-64,
	2.	Malcheski, R., Malcheski, A., Anevska, K., Glavche, M.	The role of the elementary number theory in the work with mathematically gifted students: the capabilities and challenges	Teacher Vol. 12, No. 1, pp. 127-139
	3.	Malčeski, A., Malčeski, S., Anevska, K., Malčeski, R.	New Extension of Kannan and Chatterjea Fixed Point Theorems on Complete Metric Spaces	British Journal of Mathematics & Computer Science, Vol. 17, Issue 1, pp. 1-10, 2016
	4.	Malčeski, S., Malčeski, A., Anevska, K., Malčeski, R.	Another characterization's of 2-pre-Hilbert Space	IJSIMR, e-ISSN 2347-3142, p-ISSN 2346-304X, Vol. 3, Issue 2, pp. 45-54
	5.	Malčeski, R., Manova-Erakovic, V., Malčeski, A.	Some Inequalities in Quasi 2-normed Space L^p(μ),	British Journal of Mathematics & Computer Science, Vol. 15, Issue 2, pp. 1-9
10.2.	Participation in scientific national and international projects (up to 5)			
	No.	Author	Title	Publisher/year
	1.	Malcheski A., Mushkarov O., Dimovski D., Bojvalenko P.	Student Institute	International Project, MANU - BAN
10.3.	Printed books in the last five years (up to 5)			
	No.	Author	Title	Publisher/year
	1.	Malcheski R., Malcheski A	Introduction to Elementary Number Theory	SMM, Skopje, 2015
	2.	Malcheski R., Malcheski A	Functions and Function Equations	SMM, Skopje, 2015
10.4.	Printed professional papers in the last 5 years (up to 5)			
	No.	Author	Title	Publisher/year
	1.	Grozdev S., Malcheski A.	A Litle Mathematics on Chess-board I	Numerus, 2016
	2.	Grozdev S., Malcheski A.	A Litle Mathematics on Chess-board II	Numerus, 2016

		3.	Malcheski A., Malcheski R.	Ceva's Theorem	Sigma 113, Skopje 2018
		4.			
		5.			

11.	Supervision (mentorship) of undergraduate, master and doctoral studies students		
	11.1.	Undergraduate	2
	11.2.	Master	
	11.3.	Doctoral	

12.	For mentors of doctoral thesis, selected work for the last four / five years				
	12.1.	Proof of printed scientific papers in international scientific journals or international publications in the related field (up to 6) in the past five years			
		No.	Author	Title	Publisher/year
		1.			
	12.2.	Proof of at least two printed scientific papers in international scientific journals that have impact factor in the related field in the past five years			
		No.	Author	Title	Publisher/year
		1.			
	12.3.	Proof of at least three international meetings' participation in the past four years			
		No.	Author	Title	International meeting/conferenc / year
		1.			

Add. 4		**Information about the teachers that lecture at the first, second and third study program and are mentors on the doctoral thesis**		
1.	Name (First, Last)	Nikola Tuneski		
2.	Date of birth	16.07.1971		
3.	Scientific degree / Title	Ph.D.		
4.	Title of the scientific degree	Ph.D. in mathematical sciences		
5.	Year and institution of the scientific degree	Education	Year	Institution
		Ph.D. in mathematics	1994	University of Belgrade, Serbia
		M. Sc. in mathematics	1997	UKIM, Macedonia
		B. Sc. In Engineering	1999	UKIM, Macedonia
6.	Area, field and particular specialty of master of science degree	Area	Field	Specialty
		Mathematics	Probability	Random processes

7.	Area, field and area of doctoral degree	Area	Field	Specialty
		Mathematics	Complex analysis	Geometric function theory
8.	If employed, state the institution where he/she	Institution		Title and area
		Faculty of Mechanical Engineering Ss. Cyril and Methodius University in Skopje		Full Professor, Mathematics and informatics

9. List of courses that the teacher is lecturing separately for first, second and third cycle

9.1. List of courses that the teacher is lecturing in the first cycle

No.	Course	Study program/institution
1.	Mathematics 1	all on MFS
2.	Mathematics 2	all on MFS
3.	Numetical Mathematics	Welding and welded constructions
4.	Computers and Applicative Software	Industrial design

9.2. List of courses that the teacher is lecturing in the second cycle

No.	Course	Study program/institution
1.	Selected topics in mathematics and	all on MFS
2.	Probability models and simulations	Mechatronics
3.	Applied statistics	Lean management

9.3. List of courses that the teacher is lecturing in the third cycle

No.	Course	Study program/institution
1.	Theory and Application of Differential Subordinations	Mathematical sciences and application
2.	Theory of Univalent Functions and its Application	Mathematical sciences and application

10. Selected work in the past five years

10.1. Relevant scientific printed paper (up to 5)

No.	Author	Title	Publisher/year
1.	N. Tuneski, T. Bulboaca, B. Jolevska-Tuneska	Sharp results on linear combination of simple expressions of analytic functions, Hacettepe Journal of Mathematics and Statistics, Vol.45 No.1 (2016), 121-128. (2013	Hacettepe University, Ankara, Turkey / 2016
2.	N. Tuneski, M. Nunokawa, B. Jolevska-Tuneska	Extension of some results on univalent functions, Journal of Inequalities and Applications, Vol 2015, No. 1, 2015:322. DOI 10.1186/s13660-015-0845-7. (2014	Springer-Verlag / 2015
3.	M. Nunokawa, H. Srivastava, N. Tuneski, B. Jolevska-Tuneska	Some Marx-Strohhacker Type Results for a Class of Multivalent Functions, Miskolc Mathematical Notes, Vol. 18 (2017), No. 1, 353–364. DOI: 10.18514/MMN.2017.1952	University of Miskolc, Hungary / 2017
4.	M. Elin, D. Shoikhet, N. Tuneski	Parametric Embedding of Starlike Function, Complex Anal. Oper. Theory, (2017) 11:1543–1556. DOI 10.1007/s11785-016-0634-4	Springer / 2017

	5.	N. Tuneski, T. Bulboaca	Sufficient conditions for bounded turning of analytic functions, Ukrainian Mathematical Journal, Vol.70, No.8, (2018), 1118 – 1127. (IMPACT FACTOR 2016: 0.228)	Springer, Ukrainian Academy of Science / 2018

10.2. Participation in scientific national and international projects (up to 5)

No.	Author	Title	Publisher/ year
1.	Thierry Bourgoignie, Ivan Hendrikx	Building Quality Infrastructure System in Saudi Arabia	Кралството Саудиска Арабија, 2018
2.	Никола Тунески (раководител - главен истражувач)	Теорија и примена на еднолисните функции	Меѓународен научно-истражувачки проект финансиран од Министерство за образование и наука на Р.
3.	Никола Тунески (раководител - главен истражувач)	Геометриска теорија на функциите и нејзина примена	Национален научно-истражувачки проект финансиран од Министерство за образование и наука на Р. Македонија, 2001-2004.
4.	Ivan Hendrikx (Head of the project)	Strengthening of the Serbian system of market surveillance for non-food and food products	European Union (EU Contract Number: 2012/292-614)
5.	Никола Тунески (член на тимот за реализација на проектот)	Воведување на нов простор на дистрибуции	Меѓународен научно-истражувачки проект финансиран од Министерство за образование и наука на Р. Македонија и Министерство за образование на Црна Гора, 2016 - 2018.

10.3. Printed books in the last five years (up to 5)

No.	Author	Title	Publisher/ year
1.	Thomas, Derek K.; Tuneski, Nikola; Vasudevarao, Allu	Univalent functions. A primer	De Gruyter Studies in Mathematics, 2018.

	10.4.	Printed professional papers in the last 5 years (up to 5)			
		No.	Author	Title	Publisher/ year
		1.	I. Hendrikx, B.D. Jovanoski, N. Tuneski	Dynamic simulations of market surveillance actions, 2016 IEEE Symposium on Product Compliance Engineering (ISPCE), 16-18 May	IEEE / 2016
		2	N.Tuneski	Embedding α-convex functions in the class U, Proceedings of a symposium held at the Research Institute for Mathematical Sciences, Kyoto University, Kyoto, Japan, May 22–24, 2013, 94-99. (English;	Kyoto University, Japan / 2013
11.	Supervision (mentorship) of undergraduate, master and doctoral studies students				
	11.1.	Undergraduate		/	
	11.2.	Master		1	
	11.3.	Doctoral		2	
12.	For mentors of doctoral thesis, selected work for the last four / five years				
	12.1.	Proof of printed scientific papers in international scientific journals or international publications in the related field (up to 6) in the past five years			
		No.	Author	Title	Publisher/ year
		1.	E. Aliaga, N. Tuneski	On existence of sufficient condition for univalence depending on two parameters, Proceedings of the V Congress of Mathematicians of Macedonia, September 24–27, 2014, Ohrid, R. Macedonia, Vol.2 (2015) 5–9.	Union of Mathematicians of Macedonia, 2015
		2.	E. Aliaga, N. Tuneski	Some results on the class of α-convex Janowski type functions and class U, Int. J. Appl. Math. Vol. 28 No 4 (2015), 415-425. doi:	Hikari, Bulgaria / 2015
		3.	N.Tuneski	Embedding α-convex functions in the class U, Proceedings of a symposium held at the Research Institute for Mathematical Sciences, Kyoto University, Kyoto, Japan, May 22–24, 2013, 94-99. (English; Japanese)	Kyoto University, Japan / 2013
		4.	N. Tuneski, T. Bulboaca, E. Aliaga	Some Results Over the First Derivative of Analytic Functions, Advances in Mathematics: Scientific Journal, Vol. 1 No. 1 (2012), 7 - 13.	Research Publication, Macedonia / 2012
		5.	N. Tuneski, M. Darus, E. Gelova	Simple Criteria for Bounded Turning of an Analytic Function, Advances in Mathematics: Scientific Journal, Vol. 1 No. 2 (2012), 87 - 93.	Research Publication, Macedonia / 2012

12.2. Proof of at least two printed scientific papers in international scientific journals that have impact factor in the related field in the past five years

No.	Author	Title	Publisher/ year
1.	N. Tuneski, T. Bulboaca, B. Jolevska-Tuneska	Sharp results on linear combination of simple expressions of analytic functions, Hacettepe Journal of Mathematics and Statistics, Vol.45 No.1 (2016), 121-128. (2013 IMPACT FACTOR 0.433)	Hacettepe University, Ankara, Turkey / 2016
2.	N. Tuneski, M. Nunokawa, B. Jolevska-Tuneska	Extension of some results on univalent functions, Journal of Inequalities and Applications, Vol 2015, No. 1, 2015:322. DOI 10.1186/s13660-015-0845-7. (2014 IMPACT FACTOR 0.773)	Springer-Verlag / 2015
3.	M. Nunokawa, H. Srivastava, N. Tuneski, B. Jolevska-Tuneska	Some Marx-Strohhacker Type Results for a Class of Multivalent Functions, Miskolc Mathematical Notes, Vol. 18 (2017), No. 1, 353–364. DOI: 10.18514/MMN.2017.1952 (2015 IMPACT FACTOR 0.335)	University of Miskolc, Hungary / 2017
4.	M. Elin, D. Shoikhet, N. Tuneski	Parametric Embedding of Starlike Function, Complex Anal. Oper. Theory, (2017) 11:1543–1556. DOI 10.1007/s11785-016-0634-4	Springer / 2017
5.	N. Tuneski, T. Bulboaca	Sufficient conditions for bounded turning of analytic functions, Ukrainian Mathematical Journal, Vol.70, No.8, (2018), 1118 – 1127. (IMPACT FACTOR 2016: 0.228)	Springer, Ukrainian Academy of Science / 2018

12.3. Proof of at least three international meetings' participation in the past four years

No.	Author	Title	International	Year
1	N. Tuneski, D. Shoikhet, M. Elin	Starlike functions and semigroup generators	International Congress of Mathematicians	2018
2	N. Tuneski, D. Shoikhet, M. Elin	Some results about a filtration of starlike functions	Transform Methods and Special Functions 2017, 8th International Conference, Sofia, Bulgaria, 27-30 August 2017	2017
3	N. Tuneski, David Shoikhet, Mark Elin	Some results about a filtration of starlike functions	6–th Congress of Mathematicians of Macedonia, Ohrid, Macedonia, June 15 – 18, 2016.	2016

		4	Ivan Hendrikx, Bojan D. Jovanoski, Nikola Tuneski	Dynamic simulations of market surveillance actions	IEEE Symposium on Product Compliance Engineering, May 16-18 2016, Anaheim, CA, USA.	2016
		5	Nikola Tuneski	On a class of starlike functions	2nd Workshop on Complex and Harmonic Analysis, April 13□15, 2016, Holon Institute of Technology, Holon, Israel.	2016
		6	N. Tuneski, M. Nunokawa, B. Jolevska-Tuneska	Some results on multivalent functions	"International Workshop on Geometry of Riemannian and Hermitian Manifolds", 7-10 December 2015, Sofia, Bulgaria	2015

Add. 4	**Information about the teachers that lecture at the first, second and third study program and are mentors on the doctoral thesis**			
1.	Name (First, Last)	Tashko Rizov		
2.	Date of birth	March 5, 1983		
3.	Scientific degree / Title	Ph.D.		
4.	Title of the scientific degree	Ph.D. in Technical Sciences		
5.	Year and institution of the scientific degree	Education	Year	Institution
		Ph.D in Mechanical Engineering	2014	Faculty of Mechanical engineering – Skopje
		M. Sc. In Mechanical Engineering	2010	Faculty of Mechanical engineering – Skopje
		B. Sc. In Mechanical Engineering	2006	Faculty of Mechanical engineering – Skopje
6.	Area, field and particular specialty of master of science degree	Area	Field	Specialty
		Technical sciences	Mechanical engineering	General mechanical engineering, engineering design
7.	Area, field and area of	Area	Field	Specialty
	doctoral degree	Technical sciences	Mechanical engineering	General mechanical engineering, engineering design
8.	If employed, state the	Institution	Title and area	

	institution where he/she works and the title and area in which is named		UKIM, Faculty of Mechanical Engineering	Assistant professor General mechanical engineering, engineering design

9.	List of courses that the teacher is lecturing separately for first, second and third cycle			
	9.1.	List of courses that the teacher is lecturing in the first cycle		
		No.	Course	Study program/institution
		1.	Engineering Graphics	All
		2.	Design Techniques	Industrial Design
		3.	3D Modelling and Visualization	Industrial Design
		4.	Design of Web Sites	Industrial Design
	9.2.	List of courses that the teacher is lecturing in the second cycle		
		No.	Course	Study program/institution
		1.	3D Visualization – Augmented and Virtual Reality	Industrial engineering and management
		2.		
		3.		
		4.		
	9.3.	List of courses that the teacher is lecturing in the third cycle		
		No.	Course	Study program/institution
		1.		
		2.		

10.	Selected work in the past five years				
	10.1.	Relevant scientific printed paper (up to 5)			
		No.	Author	Title	Publisher/year
		1.	Mircheski, I., Rizov, T.	Improved Nondestructive Disassembly Process using Augmented Reality and RFID Product/Part Tracking	TEM Journal. Volume 6, Issue 4, Pages 671-677, ISSN 2217-8309, Nov 2017
		2.	T. Rizov, M. Kjosevski, R. Tashevski:	Driver Assistance Systems in Vehicles Using Augmented Reality – Benefits and Challenges;	International Scientific Journal trans & MOTOAUTO WORLD, Year II,
		3.	T. Rizov, M. Kjosevski, R. Tashevski	Advanced Visualization Technologies as a Tool in the Area of Automotive Engineering	Scientific Technical Union of Mechanical Engineering / 2016
		4.	T. Rizov, R. Tashevski	Advanced Technologies for Visualization as a Tool for Identification of Vehicle Details and Elements	XXV International Automotive Conference Science and Motor Vehicles /

		5.	T. Rizov, E. Rizova	Augmented Reality as a Teaching Tool in Higher Education	International Journal of Cognitive Research in Science, Engineering and Education (IJCRSEE) / 2015, **Global Impact Factor (2014)=0,678; ICV (2013)=6.76.**
	10.2.	Participation in scientific national and international projects (up to 5)			
		No.	Author	Title	Publisher/year
		1.	T. Rizov, A. Kochov	International project for implementation of Low Carbon Technologies in companies from agro-industry in Macedonia	UNIDO / 2011-2013
		2.	M. Kjosevski, D. Danev, I. Gjurkov, A. Kostic, T. Rizov	International Project for Transport EU-Western Balkan Network for Training, Support and Promotion of Cooperation in FP7 Research Activities	FP7 Programme / 2009-2010.
		3.			
	10.3.	Printed books in the last five years (up to 5)			
		No.	Author	Title	Publisher/year
		1.	R. Tashevski, T.Rizov	Technical drawings with descriptive geometry and Autocad	Ministry of Education and Science of Republic of Macedonia / 2011
		2.	R. Polenakovic, T. Rizov	Basics of Logistics	University "Ss. Cyril and Methodius" – Skopje, 2014
	10.4.	Printed professional papers in the last 5 years (up to 5)			
		No.	Author	Title	Publisher/year
		1.			
		2.			
		3.			
		4.			
		5.			
11.	Supervision (mentorship) of undergraduate, master and doctoral studies students				
	11.1.	Undergraduate		14	
	11.2.	Master		2	
	11.3.	Doctoral		-	
12.	For mentors of doctoral thesis, selected work for the last four / five years				
	12.1.	Proof of printed scientific papers in international scientific journals or international publications in the related field (up to 6) in the past five years			
		No.	Author	Title	Publisher/year
		1.			

12.2.	Proof of at least two printed scientific papers in international scientific journals that have impact factor in the related field in the past five years				
	No.	Author	Title	Publisher/year	
	1.				
12.3.	Proof of at least three international meetings' participation in the past four years				
	No.	Author	Title	International meeting/conferenc	year
	1.				

18. Statement by the teaching staff members on providing consent to participate in the instruction in the frames of certain courses of the study programme

The Statements submitted by the teaching staff members with which they confirm that they agree to participate in teaching of certain courses from the study programme are provided in Annex 4, near the end of the Elaborate.

19. Approval from the higher education institution for the participation of the teaching staff member in the realisation of the study programme

The Approvals from the higher education institution for the participation in the realisation of the study programme of the teaching staff members who are not employed at the Faculty of Mechanical Engineering in Skopje are provided as Annex 5, near the end of the Elaborate.

20. Information on the number of students to be enrolled in the first year of the study programme

Regarding the assessment of the spacial capabilities, the equipment available, and teaching staff potential for the **Virtual manufacturing engineering** study programme, the maximum number of students to enroll yearly is planned to be 30.

21. Information on the provided compulsory and additional literature

The foreseen compulsory and additional literature (listed in the course programmes – Annex 3) is provided by the course professors, and one part of the literature is at disposal at the Library of the Faculty of Mechanical Engineering in Skopje. Professional literature translated and distributed by the Government of the Republic of Macedonia shall also be used for course programmes where stated.

22. Information on the web-site

All the information regarding the study programmes of the Faculty of Mechanical Engineering – Skopje are publicly available on the web-site of Faculty of Mechanical Engineering – Skopje: www.mf.edu.mk.

23. Professional or scientific title awarded to students upon completion of the study programme

A student who shall successfully complete the university studies of second cycle, one-year studies, **VIRTUAL MANUFACTURING ENGINEERING** study programme, shall be awarded the title:

In Macedonian:
Магистер по машинството - ***Виртуелно производно инженерство***

In English:
Master of science in mechanical engineering - ***Virtual manufacturing engineering***

The students shall receive Diploma and Diploma Supplement pursuant to the Rulebook on the Content and the Form of the Diploma, Guidelines for Preparation of the Diploma Supplement and Other Public Documents ("Official Gazette of the Republic of Macedonia" No. 102/2018).

Data on the name of the study programme and the scientific and research area, field, and branch shall be stated in the Diploma and in the Diploma Supplement.

24. Activities and mechanisms for developing and maintaining teaching quality

24.1. Study programme teaching methods

The study programmes shall be realized as full-time studies with the following forms of teaching: lectures, auditory, laboratory, and computer exercises and seminars. Regular classes shall be organised for the courses with 5 and more than 5 registered students. In case the number of students is lower than 5, mentoring will be organised.

The student load shall also be realized through special forms of activities, as individual work on seminal papers and projects intended for studying practical cases from the relevant fields of research to the studies, teamwork, research work, self-study and participation in workshops. Particular attention shall be paid to individual work with students in the form of mentoring and consulting.

The scope and organisation of the studies shall be made pursuant to Article 153 of the Law on Higher Education of the Republic of Macedonia and Article 23 of the Rulebook on the first and second cycle of studies of Ss. Cyril and Methodius University in Skopje in accordance with the ECTS methodology (the Rulebook on the Requirements, Criteria and Regulations for Enrolment and Studying at the First and Second Cycle of University Studies, „University Herald" No. 254/2013), i.e. the total workload of the students is expressed through the volume of 60 credits per year , with 30 hours of work engagement per credit, which is equal to 1,800 hours of annual workload. The number of hours of annual workload allocated to the number of weeks in both semesters, a total of 30 weeks, expresses the total weekly load of students (instruction and activities of special types).

24.2. Methods of evaluation

Evaluation of the acquired knowledge shall be performed by continuous assessment or by final examination. In the course programmes enclosed in item 13 of this document, for each course the manner of evaluation of knowledge and the ratio of evaluation of the continuous assessment activities is determined individually, i.e. the points the student acquires by realizing individual activities defined in the course programme are defined.

The final grade for each of the courses of this study programme shall be formed on the basis of the continuous or final assessment of the results achieved by the student. The final grade shall be formed on the basis of the total number of points from the continuous or final assessment the student has won, with the maximum number of possible points won being 100. The evaluation shall be performed in accordance with Article 35 of the Rulebook on the first and second cycle of studies of Ss. Cyril and Methodius University in Skopje (the Rulebook on the Requirements,

Criteria and Regulations for Enrolment and Studying at the First and Second Cycle of University Studies , „University Herald“ No. 254/2013), with application of the numerical assessment system and following the equivalences with the alphabetical grading system of the ECTS.

The student masters the study programme by passing the exams, thus earning a certain number of ECTS credits, in accordance with the structure of the study programme.

24.3. Activities and mechanisms for developing and maintaining the quality of the study programme

In order to develop and maintain the quality and the quality control, methods of continuous evaluation, self-evaluation and system for assessing the quality of the teaching staff will be implemented in the frames of the study programmes, in accordance with the provisions of the Law on Higher Education of the Republic of Macedonia and Articles 50 to 57, as well as in line with the already established mechanisms for evaluation within the Ss. Cyril and Methodius University in Skopje.

Quality assurance and quality control will be implemented in accordance with the activities and mechanisms that are implemented for all study programmes and apply to all participants in the teaching process at the Faculty of Mechanical Engineering in Skopje. The stated activities and mechanisms of self-evaluation refer to:

- Development of contents for the courses,
- Realization of the teaching process,
- Evaluation of students,
- Preparation of the final paper,
- Evaluation of the quality of teaching process by students using surveys at the end of each semester for each course,
- Evaluation of the quality of the study programme by the students on the occasion of diploma awarding and other procedures related to the resources and teaching process logistics.

Evaluation of the quality of the courses and the study programmes performed by the students shall be made permanently and shall be taken into consideration in evaluation and development of all the study programmes.

Monitoring the students' success and the realization of the programme by the Educational and Scientific Council of the Faculty of Mechanical Engineering shall be applied as activities for development and maintenance of quality and quality control of the study programme. The Council will conduct an internal evaluation of the content of the study programme in the direction of improvement and development in accordance with the contemporary trends in the field.

24.4. Results of the performed self-evaluation according to the Guidelines on the Common Basis for Evaluation and Evaluation Procedures of Universities adopted by the Agency for Evaluation of Higher Education in the Republic of Macedonia and the Inter-University Conference of the Republic of Macedonia (Skopje-Bitola, September 2002).

The results have been published in the Self-evaluation Report of the Faculty of Mechanical Engineering - Skopje for the reporting period 2013-2016, No. 02-1991/2 of November 27, 2017, in accordance with the Guidelines for self-evaluation and assurance and evaluation of the quality of the units of the University, passed by the University Senate (9th Session/April 30, 2013):

https://www.mf.ukim.edu.mk/mk/content/резултати-од-анкетисамоевалуациј

24.5 Results of the performed external evaluation of the Ss. Cyril and Methodius University in Skopje

The results of the external evaluation of the Ss. Cyril and Methodius University in Skopje can be found at the following link:

http://ukim.edu.mk/dokumenti_m/297_nadvoresna%202018%20-%20prevod%20(002).docx

ANNEX 1

Decision for adopting the study program by the Academic Council of Scientific unit (Faculty of Mechanical engineering – Skopje)

Машински факултет
Број 02-228/15
31.01.2019 год.
Скопје

Врз основа на член 110 став 1 точка 6 и член 145 став 1 од Законот за високото образование ("Службен весник на РМ" број 82/2018), како и член 2 и 3 од Правилникот за донесување студиски програми (Универзитетски гласник број 140/2009), Наставно-научниот совет на Машинскиот факултет во Скопје, на 30-та редовна седница, одржана на 31 јануари 2019 година, ја донесе следнава

О Д Л У К А
за основање студиска програма на втор циклус студии на англиски јазик на Машински факултет во Скопје

1. Се основа студиска програма на англиски јазик **Virtual manufacturing engineering (VME) – Виртуелно производно инженерство (ВПИ)** на втор циклус студии на Машинскиот факултет во Скопје во состав на Универзитетот "Св. Кирил и Методиј" во Скопје, за акредитација.

2. Студиската програма е од видот втор циклус на академски студии (постдипломски студии) во траење од една година (2 семестри), се организира како редовни студии за стекнување 60 ЕКТС кредити по моделот 4+1 и научен назив магистер или Master of Science (MSc) на англиски јазик.

3. Проектот/Елаборатот за основање – акредитација на студиската програма усвоен од Наставно-научниот совет и оваа одлука се упатуваат на Универзитетот "Св. Кирил и Методиј" во Скопје на натамошна постапка за усвојување.

4. Студиите по новата студиска програма на англиски јазик ќе отпочнат од учебната 2019/2020 година.

5. Составен дел на оваа одлука е Проектот/Елаборатот за основање - акредитација на студиската програма.

Одлуката да се достави до: Универзитетот, наставно-научен совет, продекан за МСНР, ОАЕВО, за елаборатот и архивата на Факултетот.

Универзитет "Св. Кирил и Методиј" во Скопје
Машински факултет - Скопје
Декан

Проф. д-р Дарко Данев

ANNEX 2

Decision for adopting the study program from Rector's Office or the University Senate Council or the Council of scientific institution

Бр. 02-314
28.2.2019
Скопје

Врз основа на член 94, став 1, алинеја 3 од Законот за високото образование, (Службен весник на Република Македонија бр.82/2018), по предлог на Наставно-научниот совет на Машинскиот факултет, Универзитетскиот сенат на Универзитетот „Св. Кирил и Методиј“ во Скопје, на 29. седница одржана на 28 февруари 2019 година, донесе

О Д Л У К А
за усвојување на предлог-проектите за акредитација на студиските програми од втор циклус студии на Машинскиот факултет во Скопје

Член 1

Универзитетскиот сенат ги усвојува предлог-проектите за акредитација на студиските програми од втор циклус студии на Машинскиот факултет во Скопје, и тоа:

- едногодишната студиска програма **Напредни производни системи и технологии**
- едногодишната студиска програма **Механика и машински системи**
- едногодишната студиска програма **Индустриски дизајн**
- едногодишната студиска програма **Modeling and Stimulation of Plastic Deformation Technologies and Processes**
- едногодишната студиска програма **Lean Management**
- едногодишната студиска програма **Virtual Manufacturing Engineering**

Член 2

Универзитетскиот сенат ги упатува проектите од член 1 на оваа Одлука до Одборот за акредитација и евалуација на високото образование на натамошна постапка за акредитација. Проектите, во печатена и во електронска форма до Одборот за акредитација и евалуација на високото образование се доставуваат од страна на единицата на Универзитетот - предлагач и организатор на студиската програма.

Член 3

Оваа Одлука стапува во сила со нејзиното донесување и ќе се објави во *Универзитетски гласник.*

РЕКТОР

Проф. д-р Никола Јанкуловски

Доставено до:
- Машинскиот факултет во Скопје
- Одборот за акредитација и евалуација на високото образование

ANNEX 3

Opinion of the Board on Public Cooperation and Trust

Машински факултет
Број 02-230/18
11.02.2019 год.
Скопје

Врз основа на член 3 став 1 алинеја 1 од Правилникот за поблиските критериуми и надлежности на одборите за соработка и доверба со јавноста ("Сл. весник на РМ" број 148/2013), во согласност со член 4 од Упатството за начинот и постапката на кој Одборот за соработка и доверба со јавноста дава мислење по студиските програми (Универзитетски гласник број 255/2013), Одборот за соработка и доверба со јавноста на Машински факултет во Скопје, на 12-та седница одржана на 11 февруари 2019 година, го донесе следново

М И С Л Е Њ Е
за студиска програма од втор циклус на студии

1. Се дава позитивно мислење за општествена оправданост за основање на студиската програма на англиски јазик **Virtual manufacturing engineering (VME)** – **Виртуелно производно инженерство (ВПИ)** од втор циклус на академски студии (постдипломски студии) на Машинскиот факултет во Скопје во состав на Универзитетот "Св. Кирил и Методиј" во Скопје.

2. Основањето на студиската програма, по содржина и обем, како и по општите и специфичните дескриптори на квалификацијата, е во согласност со законските одредби и со општествените потреби.

3. Мислењето се дава до Сенатот на Универзитетот "Св. Кирил и Методиј" во Скопје, за натамошно постапување по однос на студиската програма.

Примерок од мислењето да се достави до: универзитет x2, одборот и архивата на Факултетот.

Претседател на Одборот за
соработка и доверба со јавноста

Наташа Јаневска

ANNEX 4

Teachers statement of consent for participation in teaching specific subjects of the study program

Врз основа на членот 2 од Правилникот за задолжителни компоненти кои треба да ги поседуваат студиските програми од првиот, вториот и третиот циклус студии ја давам следната

ИЗЈАВА

Од доц. д-р Ташко Ризов, во звање доцент, вработен/а на Машински факултет - Скопје при Универзитетот „Св. Кирил и Методиј“ во Скопје.

ИЗЈАВУВАМ ДЕКА СУМ СОГЛАСНА/ЕН да учествувам во изведување на наставата на студиската програма ВИРТУЕЛНО ПРОИЗВОДНО ИНЖЕНЕРСТВО на втор циклус студии при Машински факултет – Скопје на предметот:

1. AUGMENTED REALITY
2.
3.

Своерачен потпис

Доц. д-р Ташко Ризов

Врз основа на членот 2 од Правилникот за задолжителни компоненти кои треба да ги поседуваат студиските програми од првиот, вториот и третиот циклус студии ја давам следната

ИЗЈАВА

Од Јасмина Чалоска, во звање редовен професор, вработен/а на Машински факултет - Скопје при Универзитетот „Св. Кирил и Методиј“ во Скопје.

ИЗЈАВУВАМ ДЕКА СУМ СОГЛАСНА/ЕН да учествувам во изведување на наставата на студиската програма **VIRTUAL MANUFACTURING ENGINEERING**на втор циклусстудии при Машински факултет – Скопје на предметите:

1. MODELING AND SIMULATION OF PLASTIC DEFORMATION TECHNOLOGIES AND TOOLS
2. ERGONOMIC SYSTEMS

Своерачен потпис

Проф. д-р Јасмина Чалоска

Врз основа на членот 2 од Правилникот за задолжителни компоненти кои треба да ги поседуваат студиските програми од првиот, вториот и третиот циклус студии ја давам следната

ИЗЈАВА

Од Миновски Роберт, во звање професор, вработен/а на Машински факултет - Скопје при Универзитетот „Св. Кирил и Методиј" во Скопје.

ИЗЈАВУВАМ ДЕКА СУМ СОГЛАСНА/ЕН да учествувам во изведување на наставата на студиската програма Virtual Manufacturing Engineering на втор циклус студии при Машински факултет – Скопје на предметот:

1. Business Information Systems

Своерачен потпис

Проф. д-р

Врз основа на членот 2 од Правилникот за задолжителни компоненти кои треба да ги поседуваат студиските програми од првиот, вториот и третиот циклус студии ја давам следната

ИЗЈАВА

Од Атанас Кочов , во звање редовен професор, вработен на Машински факултет - Скопје при Универзитетот „Св. Кирил и Методиј“ во Скопје.

ИЗЈАВУВАМ ДЕКА СУМ СОГЛАСЕН да учествувам во изведување на наставата на студиската програма **VIRTUAL MANUFACTURING ENGINEERING** на втор циклус студии при Машински факултет – Скопје на предметот:

1. 3D DIGITALIZATION PROCESSES IN MANUFACTURING
2. TECHNOLOGY OF RAPID PROTOYPING – ADITIVE MANUFACTURING

Своерачен потпис

Проф. д-р Атанас Кочов

Врз основа на членот 2 од Правилникот за задолжителни компоненти кои треба да ги поседуваат студиските програми од првиот, вториот и третиот циклус студии ја давам следната

ИЗЈАВА

Од **Зоран Пандилов**, во звање **редовен професор д-р** вработен на Машински факултет - Скопје при Универзитетот „Св. Кирил и Методиј“ во Скопје.

ИЗЈАВУВАМ ДЕКА СУМ СОГЛАСЕН да учествувам во изведување на наставата на студиската програма **ВИРТУЕЛНО ПРОИЗВОДНО ИНЖЕНЕРСТВО (VIRTUAL MANUFACTURING ENGINEERING),** на втор циклус студии при Машински факултет – Скопје на предметите:

1. **FLEXIBLE AUTOMATION**
2. **NUMERICALLY CONTROLLED MACHINES AND CNC PROGRAMMING**
3. **VIRTUAL DESIGN OF PRODUCTION SYSTEMS AND MACHINES**

Своерачен потпис

Проф. д-р Зоран Пандилов

Врз основа на членот 2 од Правилникот за задолжителни компоненти кои треба да ги поседуваат студиските програми од првиот, вториот и третиот циклус студии ја давам следната

ИЗЈАВА

Од д-р Валентина Гечевска, во звање редовен професор, вработен/а на Машински факултет - Скопје при Универзитетот „Св. Кирил и Методиј“ во Скопје.

ИЗЈАВУВАМ ДЕКА СУМ СОГЛАСНА/ЕН да учествувам во изведување на наставата на студиската програма Virtual manufacturing engineering на втор циклус студии при Машински факултет – Скопје на предметот:

1. Intelligent processes and smart technologies

Своерачен потпис

Проф. д-р Валентина Гечевска

Врз основа на членот 2 од Правилникот за задолжителни компоненти кои треба да ги поседуваат студиските програми од првиот, вториот и третиот циклус студии ја давам следната

ИЗЈАВА

Од Алекса Малчески во звање редовен професор, вработен/а на Машински факултет - Скопје при Универзитетот „Св. Кирил и Методиј“ во Скопје.

ИЗЈАВУВАМ ДЕКА СУМ СОГЛАСНА/ЕН да учествувам во изведување на наставата на студиската програма Virtual Manufacturing Engineering на втор циклус студии при Машински факултет – Скопје на предметот:

1. Selected Topics in Mathematics and Informatics

Своерачен потпис

Проф. д-р Алекса Малчески

Врз основа на членот 2 од Правилникот за задолжителни компоненти кои треба да ги поседуваат студиските програми од првиот, вториот и третиот циклус студии ја давам следната

ИЗЈАВА

Од Никола Тунески во звање редовен професор, вработен/а на Машински факултет - Скопје при Универзитетот „Св. Кирил и Методиј“ во Скопје.

ИЗЈАВУВАМ ДЕКА СУМ СОГЛАСНА/ЕН да учествувам во изведување на наставата на студиската програма Virtual Manufacturing Engineering на втор циклус студии при Машински факултет – Скопје на предметот:

1. Selected Topics in Mathematics and Informatics

Своерачен потпис

Проф. д-р Никола Тунески

Врз основа на членот 2 од Правилникот за задолжителни компоненти кои треба да ги поседуваат студиските програми од првиот, вториот и третиот циклус студии ја давам следната

ИЗЈАВА

Од Душан Чакмаков во звање редовен професор, вработен/а на Машински факултет - Скопје при Универзитетот „Св. Кирил и Методиј“ во Скопје.

ИЗЈАВУВАМ ДЕКА СУМ СОГЛАСНА/ЕН да учествувам во изведување на наставата на студиската програма Virtual Manufacturing Engineering на втор циклус студии при Машински факултет – Скопје на предметот:

1. Selected Topics in Mathematics and Informatics
2. Database Systems

Своерачен потпис

Проф. д-р Душан Чакмаков

Врз основа на членот 2 од Правилникот за задолжителни компоненти кои треба да ги поседуваат студиските програми од првиот, вториот и третиот циклус студии ја давам следната

ИЗЈАВА

Од д-р Глигорче Вртаноски, во звање редовен професор, вработен на Машински факултет - Скопје при Универзитетот „Св. Кирил и Методиј“ во Скопје.

ИЗЈАВУВАМ ДЕКА СУМ СОГЛАСЕН да учествувам во изведување на наставата на студиската програма „Virtual Manufacturing Engineering“ на втор циклус студии при Машински факултет – Скопје на предметот:

1. Virtual Manufacturing
2. Computed Integrated Manufacturing
3. Virtual Design of Production Systems and Machines
4. TQM

Своерачен потпис

Проф. д-р Глигорче Вртаноски

ANNEX 5

Consent from the higher educational institution for teacher participation in the realization of the study program

In this study program only lecturers from the Faculty of Mechanical Engineering will be involved.

ANNEX 6

Diploma supplement

Faculty of Mechanical Engineering - Skopje

1. Information identifying the holder of the qualification	
1.1. Name	
1.2. Surname	
1.3. Date, place, and country of birth	
1.4. Unique Master Citizen Number	
2. Information identifying the qualification	
2.1. Date of issuance	
2.2. Name of qualification	Master of science in mechanical engineering - *Virtual manufacturing engineering*
2.3. Name of study programme, main area, field, and branch of study	Virtual Manufacturing Engineering study programme, Scinetific area – Technical and technological sciences, Field – 214 Mechanical Engineering Branch – all the domains listed in the relevant scientific field and other.
2.4. Name and status of awarding institution	Ss. Cyril and Methodius University in Skopje – Faculty of Mechanical Engineering
2.5. Name and status of higher education institution administering the studies (if different)	
2.6. Language of instruction	English / Macedonian
3. Information on the level (cycle) of the qualification	
3.1. Type of qualification (academic/vocational studies)	Academic studies
3.2. Level (cycle) of qualification	Second cycle of studies (graduate studies)
3.3. Official length of programme: years and ECTS credits	2 semesters, 1 year, 60 credits
3.4. Study programme enrollment requirements	Completed undergraduate studies, 240 credits

4. Information on the contents and results gained	
4.1. Mode of study (full-time, part-time)	Full-time
4.2. Programme requirements and results	Knowledge, skills, and competencies in the field of Mechanical Engineering with a specialty in the field of Production Engineering (Virtual Manufacturing Engineering, Modelling and Simulation of Systems and Product Design)
4.3. Programme details (orientation, module, grades, ECTS credits)[1]	The Results Certificate containg the couses completed and credits won is attached.
4.4. Evaluation scheme (grading scheme and criteria)	The number of points represents the overall workload of the student (lecture attendance, laboratory work, tests, seminal papers, examinations, individual tasks). For earning up to 50% of the total points, grade 5 is awarded, for earning from 51% to 64% of the total points grade 6 is awarded, for earning from 65% to 74% of the total points grade 7 is awarded, for earning from 75% to 84% of the total points grade 8 is awarded, for earning from 85% to 94% of the total points grade 9 is awarded, and for earning from 95% to 100% grade 10 is awarded. (10=A/A+, 9=A-/B+, 8=B-, 7=C, 6=D, 5=F)
4.5. Grade point average (GPA)	
5. Data on the function of the qualification	
5.1. Access to further study	Third cycle of studies
5.2. Professional status (if applicable)	
6. Additional information	
6.1. Additional information on the student	
6.2. Additional information on the higher education institution	Faculty of Mechanical Engineering – Skopje Address: Rugjer Boshkovikj no. 18, P.Box 464, 1000 Skopje Telephone: +389 2 3063 374 e-mail: mf@mf.edu.mk web-site: www.mf.edu.mk
7. Certification of the supplement	
7.1. Date and place	
7.2. Name and signature	Professor Darko Danev, PhD Professor Nikola Jankulovski, PhD
7.3. Capacity of the signee	Dean Rector
7.4. Seal	Seal of the Unit Seal of the University

[1] The Appendix mentioned in 4.3 is the Results Certificate