

**SS. CYRIL AND METHODIUS UNIVERSITY IN SKOPJE
FACULTY OF MECHANICAL ENGINEERING - SKOPJE**



E L A B O R A T
FOR REACREDITATION OF A STUDY PROGRAM
“SUSTAINABLE ENERGY AND ENVIRONMENT”
“ОДРЖЛИВА ЕНЕРГЕТИКА И ЖИВОТНА СРЕДИНА”

Second cycle of academic studies
One-year studies

PROPOSER INSTITUTION:
Faculty of Mechanical engineering in Skopje

Skopje, November, 2024

Content

1. PRIVATE DATA ABOUT THE APPLICANT	4
Name of higher education institution	4
2. 1 ESTABLISHMENT ON THE HIGHER EDUCATION INSTITUTION - FOR THE UNIVERSITY	4
2.2 _ ESTABLISHMENT AT THE HIGHER EDUCATION INSTITUTION – FOR THE UNIT APPLICANT FOR ACCREDITATION	4
2.3 _ ESTABLISHMENT AT THE HIGHER EDUCATION INSTITUTION – FOR INDEPENDENT VOCATIONAL SCHOOL	5
3. OWNERSHIP STRUCTURE OF THE HIGHER EDUCATION INSTITUTION	5
5 . REPRESENTATIVE AUTHORITY OF THE HIGHER EDUCATION INSTITUTION	5
Legal framework:	6
1. Map of the higher education institution (University, faculty, ie higher vocational school)	6
1.1. Map of higher education institution	6
1. 2 . Map of a higher education institution - for interdisciplinary studies - participants in the study program	10
2 . DATA ON THE UNIT ORGANIZATION OF THE STUDY PROGRAM	11
3. ABOUT PSHTI DATA ON THE STUDY PROGRAM	15
3 . Purpose and justification for introducing the study program	17
4 . Compliance of the study program with the needs of society for the given personnel profile	17
5 . National Framework of Qualifications , study program _____ , _____, University _____, in accordance with the Regulation on the national framework of higher education qualifications	18
6. b. Specific descriptors of qualifications for the second cycle of one / two year studies with 60/120 ECTS, for the study program submitted for (re)accreditation , in accordance with the Decree on the national framework of higher education qualifications	20
7 . Determined ratio between mandatory and optional subjects, with a list of mandatory subjects, a list of optional subjects and a defined way of choosing the subjects.	20
STRUCTURE OF THE STUDY PROGRAM	20
7.1. Rules and method of choosing elective subjects with the possibility of choosing subjects from other accredited study programs	23
7.2. Deadlines for completing the planned activities from the study program	23
8 . List of teaching staff with data specified in Article 7 (Annex No. 4) of the Rulebook on the content of study programs ("Official Gazette of the Republic of Macedonia", No. 79/2023) and Article 61 paragraph 3 of the Law on Higher Education ("Official Gazette of the Republic of Macedonia", No. 82/2018)	24
9 . List of provided required number of non-teaching staff , in accordance with Article 13 of the Rulebook on Standards and Norms for the Establishment and Performance of Higher Education Activities (Official Gazette of the Republic of North Macedonia No. 245/22)	27
10 . Data on the space provided for the implementation of the Study Program _____, organized at the Faculty _____ in accordance with Article 20 of the Rulebook on Standards and Norms for the Establishment and Performance of Higher Education Activities ("Official Gazette of the Republic of North Macedonia No. 245/22)	27
11 . List of equipment and IT-technical resources provided for the realization of the study program _____, _____ faculty , in accordance with Annex 2 of the Rulebook on standards and norms for the establishment and performance of higher education activities ("Official Gazette of the Republic of North Macedonia" no. 245/22)	28
12 . Information on the number of students (enrolled for the first time) of the study program in the period since the last accreditation	34

12.1 Students with special needs in accordance with Article 36 of the Rulebook on Norms and Standards for the Establishment of Higher Education Institutions and Performing Higher Education Activities (Official Gazette of the Republic of North Macedonia No. 245/22)	36
13 . Information on scientific research and publishing activity in accordance with Article 18 of the Rulebook on Norms and Standards for the Establishment of Higher Education Institutions and Performing Higher Education Activity (Official Gazette of the Republic of North Macedonia No. 245/22)	36
14 . Library and information on compulsory and additional literature provided Article 37 of the Rulebook on Norms and Standards for the Establishment of Higher Education Institutions and Performing Higher Education Activities (Official Gazette of the Republic of North Macedonia No. 245/22)	37
15. Information about the website (Article 21 of the Law on Higher Education (Official Gazette of the Republic of North Macedonia No. 82/18) and Article 18 of the Rulebook on Standards and Norms for the Establishment of Higher Education Institutions and Performing Higher Education Activities (Official Gazette of the Republic of North Macedonia) North Macedonia No. 245/22)	43
16 . Activities and mechanisms through which the quality of teaching is developed and maintained	44
17 . Results of the performed self-evaluation according to the Guidelines for the unique bases of the evaluation and evaluation procedures of the universities adopted by the agency for the evaluation of higher education in the Republic of Macedonia and by the Interuniversity Conference of the Republic of Macedonia (Skopje-Bitola, September 2002).	44
18 . The adequacy of the structure and content of the cycle of studies with the general and specific descriptors	44
19. Compliance of theoretical and practical teaching with the objectives of the study program	47
20 . Compliance of the study program with the single European area for higher education and comparability with the programs of European higher education institutions	47
23. Data on teachers who can be mentors of master's thesis of the second cycle of academic/professional studies of the study program	48
1. Proposal Decision for the adoption of the study program by the Teaching and Scientific Council of the faculty, the teaching council of the higher vocational school or the scientific council of the scientific institute Article 110 and Article 145 of the Law on Higher Education ("Official Gazette of the Republic of Macedonia " no . 82/2018)	51
2. Decision on the adoption of the study program by the University Senate, i.e. the Council of the Scientific Institution; Article 94 and Article 145 of the Law on Higher Education (Official Gazette of the Republic of Macedonia No. 82/2018)	52
3. Opinion of the Board for cooperation and trust with the public	53
4. Statement from the teacher for giving consent to participate in teaching certain subjects from the study program	54
5. Consent of the University Senate , i.e. the Academic Council for the teacher's participation in the implementation of the study program of a unit from another University (Article 179 of the Law on Higher Education, Official Gazette of the Republic of Macedonia, No. 82/2018 Error! Bookmark not defined.	
APPENDIX NO. 3	71
1. Subject programs with information in accordance with Article 4 of the Rulebook on the content of study programs ("Official Gazette of the Republic of Macedonia", no . 79/2023)	71

☐	First accreditation
☒	Reaccreditation

1. GENERAL DATA FOR THE APPLICANT

Name of higher education institution

„Ss. Cyril and Methodius” University in Skopje, Faculty of Mechanical Engineering - Skopje

Address, headquarters

Rugjer Boshkovikj 18, P.O.Box 464, 1000 Skopje

EMS

4066499

Identification number

6462804

Telephone

02/3099200

Fax

E-mail

contact@mf.ukim.edu.mk

Website of the institution

www.ukim.edu.mk www.mf.ukim.edu.mk**2. 1 ESTABLISHMENT ON THE HIGHER EDUCATION INSTITUTION- FOR THE UNIVERSITY**

Name of the founder	General Assembly of the Republic of North Macedonia
Title of the act of incorporation	Macedonia Law for establishing higher educational insitution – University Ss Cyril and Methodius in Macedonia
Number and date of the act of incorporation	No. 6/1949 Official Gazetta of the Republic of Macedonia
Changes in founding rights (name of the second founder and legal successors of the founder)	N/A
Number and date of the Decision on the fulfillment of the conditions for starting work and the activity issued by the Ministry of Education and Science of the Republic of North Macedonia	N/A
Number and date The decision on accreditation of the higher education institution issued by the Board for Accreditation and Evaluation of Higher Education of the Republic of North Macedonia.	N/A
Number and date of the Decision on enrollment of the higher education institution in the Central Registry	N/A

2.2 ESTABLISHMENT OF THE HIGHER EDUCATION INSTITUTION - FOR THE UNIT APPLICANT FOR ACCREDITATION

Name of the founder	National assembly of Republic of North Macedonia
Title of the act of incorporation	Law for establishing higher educational insitutions in Macedonia – Faculty for Medicine and Faculty for technical sciences in Skopje
Number and date of the act of incorporation	Resolution No 10 from June 19 th 1959
Changes in founding rights (name of the second founder and legal successors of the founder)	N/A
Changes in founding rights	N/A

(name of the second founder and legal successors of the founder)	
Number and date of the Decision on the fulfillment of the conditions for starting work and the activity issued by the Ministry of Education and Science of the Republic of North Macedonia	N/A
Number and date The decision on accreditation of the higher education institution issued by the Board for Accreditation and Evaluation of Higher Education of the Republic of North Macedonia.	N/A
Number and date of the Decision on enrollment of the higher education institution in the Central Registry	N/A

2.3 ESTABLISHMENT AT THE HIGHER EDUCATION INSTITUTION - FOR AN INDEPENDENT VOCATIONAL SCHOOL

Name of the founder	
Title of the act of incorporation	
Number and date of the act of incorporation	
Changes in founding rights (name of the second founder and legal successors of the founder)	
Changes in founding rights (name of the second founder and legal successors of the founder)	
Number and date of the Decision on the fulfillment of the conditions for starting work and the activity issued by the Ministry of Education and Science of the Republic of North Macedonia	
Number and date The decision on accreditation of the higher education institution issued by the Board for Accreditation and Evaluation of Higher Education of the Republic of North Macedonia.	
Number and date of the Decision on enrollment of the higher education institution in the Central Registry	

3. OWNERSHIP STRUCTURE OF THE HIGHER EDUCATION INSTITUTION

X	<u>State – public institution</u>		Private		Mixed
---	-----------------------------------	--	---------	--	-------

5 . REPRESENTATIVE AUTHORITY OF THE INSTITUTION OF HIGHER EDUCATION

Name and surname, position (Rector, Dean, Director)

Prof. d-r Zlatko Petreski, full time professor

Date and act of appointment

October 1st, 2023

contact number

+389 72 228 422

Email

zlatko.petreski@mf.ukim.edu.mk

Contact person

Name and
surname

Prof. d-r Zoran Markov

telephone

+389 70 278473

Email

zoran.markov@mf.edu.mk

Date: December 18, 2024

M.P

Authorized person
Prof. d-r Zlatko Petreski, full time professor

Legal frame:

Legal basis for preparing the Elaboration	
1	Law on Higher Education (Official Gazette of the Republic of Macedonia, No. 82/2018);
2	Rulebook on the standards and norms for the establishment of higher education institutions and for the performance of higher education activities ("Official Gazette of the Republic of North Macedonia" no. 245/22 and no. 4/23)
3	Rulebook on methodology, standards and procedure for accreditation of higher education institutions and for accreditation of study programs ("Official Gazette of the Republic of North Macedonia" no. 256 / 22)
4	Rulebook on the standards and norms for the establishment of scientific institutes and for performing scientific research activities ("Official Gazette of the Republic of North Macedonia" no. 245/22)
5	Rulebook on the content of study programs (Official Gazette of the Republic of North Macedonia, no. 79/23);
6	Guidelines for the criteria for the method of ensuring and evaluating the quality of higher education institutions and academic staff in the Republic of Macedonia (Official Gazette of the Republic of Macedonia, no. 67/13);
7	The decree on the national framework of higher education qualifications ("Official Gazette of the Republic of Moldova" no. 154/2010),
8	National framework of occupations ("Official Gazette of the Republic of Macedonia" no. 178/15)
9	Rulebook on the content and form of the diploma, instructions for the preparation of supplements to the diploma and other public documents ("Official Gazette of the Republic of Macedonia" no. 84/09)
10	Law on the Military Academy ("Official Gazette of the Republic of Macedonia" No. 83/2009)
11	Rulebook on the closer criteria and competence of the boards for cooperation and trust with the public ("Official Gazette of the Republic of Macedonia" no. 148/13)
12	Rulebook on the method and conditions for organizing practical teaching for students ("Official Gazette of the Republic of Macedonia" no. 71/09 and 120/10)
13	Rulebook on the conditions that must be fulfilled by the distinguished expert from the practice of the relevant area for the performance of clinical teaching ("Official Gazette of the Republic of Macedonia" no. 71/09 and 120/10)
14	Law on medical studies and continuous professional development of doctors of medicine ("Official Gazette of the Republic of Moldova" no. 16/13)
15	Law on recognition of professional qualifications ("Official Gazette of the Republic of Macedonia" no. 171/10)
16	Rulebook on the method and procedure for managing the database for higher education activity ("Official Gazette of the Republic of Macedonia" no. 65/13)
17	Law on scientific research activity ("Official Gazette of the Republic of Macedonia" no. 46/08, 103/08, 24/11 and 80/12)
18	Law on higher education institutions for the education of teaching staff in pre-school education, primary and secondary education ("Official Gazette of the Republic of Macedonia" no. 10/15)
19	Statute of the higher education institution
20	The decision on accreditation of the higher education institution issued by the Board for Accreditation and Evaluation of Higher Education of the Republic of Macedonia.
21	The decision on accreditation of a study program issued by the Board for Accreditation of Higher Education of the Republic of Macedonia.
22	The decision to start work issued by the Ministry of Education and Science of the Republic of Macedonia, that is, by AKVO (AQAHE).

1. Map of the higher education institution (University, faculty, i.e. higher vocational school)**1.1. Map of higher education institution**

Name of the higher	In Macedonian language	Универзитет „Св. Кирил и Методиј“ во Скопје Машински факултет - Скопје
	In English	„Ss. Cyril and Methodius” University in Skopje Faculty of Mechanical Engineering

education institution	In the language in which the teaching is conducted	„Ss. Cyril and Methodius” University in Skopje Faculty of Mechanical Engineering
Headquarters		Rugjer Boshkovikj 18, P.O.Box 464, 1000 Skopje
Webpage		www.mf.ukim.edu.mk
Type of higher education institution (public, private, private-public)		Public institution No. 6462804 No of registered activity 85.42
Data on the last accreditation		First cycle of studies Production engineering Accreditation decision: number 08-113/6 of 25.07.2022 Motor vehicles, transport, mechanization and logistics Accreditation decision: number 08-116/4 of 25.07.2022 Thermal engineering Accreditation decision: number 08/-117/6 of 25.07.2022 Hydraulic Power Engineering Accreditation decision: number 08-118/6 of 25.07.2022 Industrial Engineering and Management Accreditation decision: number 08-114/4 of 25.07.2022 Automation and control systems Accreditation decision: number 08-120/6 of 25.07.2022 Energy and ecology Accreditation decision: number 08-119/6 of 25.07.2022 Mechatronics Accreditation decision: number 08-121/7 of 25.07.2022 Industrial design Accreditation decision: number 08-122/6 of 25.07.2022 Materials, processes and innovations Accreditation decision: number 08-115/6 of 25.07.2022 Second cycle of studies (one-year) Sustainable energy and environment Accreditation decision: number 1409-1/4 of 24.09.2020 Product life cycle management Accreditation decision: number 1409-2/4 of 30.10.2020 Materials, Welding and Structural Engineering Accreditation decision: number 08-162/7 of 16.09.2024 Transport, mechanization and logistics Accreditation decision: number 08-168/7 of 01.10.2024 Thermal power engineering Accreditation decision: number 08-169/7 of 16.09.2024 Automation and Fluid Engineering Accreditation decision: number 08-167/7 of 01.10.2024 Motor vehicles Accreditation decision: number 08-171/9 of 01.10.2024 Industrial Engineering and Management Accreditation decision: number 08-164/7 of 01.10.2024 Energy and environment Accreditation decision: number 08-166/7 of 16.09.2024 Mechatronics Accreditation decision: number 08-159/7 of 01.10.2024 Advanced production systems and technologies Accreditation decision: number 08-170/7 of 01.10.2024 Mechanics and machine systems Accreditation decision: number 08-160/7 of 01.10.2024 Industrial design Accreditation decision: number 08-165/7 of 16.09.2024 Lean management Accreditation decision: number 08-163/7 of 01.10.2024

	Management of occupational health and safety systems Accreditation decision: number 08-949/6 of 21.03.2023 Management and Quality Control Accreditation decision: number 08-575/4 of 21.10.2022 Third cycle of studies Mechanical engineering Accreditation decision: number 08-191/4 of 21.07.2021 Industrial Engineering and Management Accreditation decision: number 08-190/6 of 18.08.2021																																																																																																																																		
Field of study or artistic discipline according to the International Standard Classification of Education of UNESCO (MSCOB, ISCED) and scientific research areas (According to the International Frascati Classification of 2015) for which accreditation has been obtained	Mechanical engineering, Machinery, Energy, 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																																																																																																																																		
Data on international cooperation on the teaching plan, scientific research work and student mobility	The Faculty of Mechanical Engineering has international cooperation in the field of teaching, research and student mobility within the, Erasmus and Erasmus + program (signed several agreements with universities from Europe and Worldwide), Fulbright program sponsored by US government, DAAD program from German Government, Norwegian research Agency etc. More information available at http://www.ukim.edu.mk/dokumenti_m/431_Erazmus+%20dogovo%20ri.doc and other agreements on international cooperation.																																																																																																																																		
Data on the space intended for the performance of teaching and research activities	1.Total area (gross area) (space for teaching and yard) 9918 m² 2.Total teaching area (net space) 4840 m² 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><tr><td></td><td>K2-6</td><td>1</td><td>44,7</td><td>28</td></tr><tr><td></td><td>K2-7</td><td>1</td><td>44,7</td><td>25</td></tr><tr><td></td><td>K2-15</td><td>1</td><td>44,7</td><td>20</td></tr><tr><td></td><td>K3-9</td><td>1</td><td>80</td><td>40</td></tr><tr><td></td><td>K3-1</td><td>1</td><td>55,1</td><td>36</td></tr><tr><td></td><td>K3-18</td><td>1</td><td>55,1</td><td>36</td></tr></table>	no.	Types of didactic space numeration	Number of premises	Area in square metres	Total seating capacity	1.	Lecture theaters	2	426	480		AMF	1	228	300		225	1	198	180	2.	Classrooms	25	1628,8	1113		123	1	87	56		124	1	87	64		125	1	75	40		224	1	111	80		310	1	127	88		311	1	76	48		A1-1	1	88	88		A1-2 left	1	38	38		A1-2 right	1	43	28		A1-3	1	43	28		A1-5	1	43	28		F1-2	1	54,5	22		F2-4	1	60,4	32		F2-5	1	42,3	18		F2-6	1	53,3	22		K2-6	1	44,7	28		K2-7	1	44,7	25		K2-15	1	44,7	20		K3-9	1	80	40		K3-1	1	55,1	36		K3-18	1	55,1	36
no.	Types of didactic space numeration	Number of premises	Area in square metres	Total seating capacity																																																																																																																															
1.	Lecture theaters	2	426	480																																																																																																																															
	AMF	1	228	300																																																																																																																															
	225	1	198	180																																																																																																																															
2.	Classrooms	25	1628,8	1113																																																																																																																															
	123	1	87	56																																																																																																																															
	124	1	87	64																																																																																																																															
	125	1	75	40																																																																																																																															
	224	1	111	80																																																																																																																															
	310	1	127	88																																																																																																																															
	311	1	76	48																																																																																																																															
	A1-1	1	88	88																																																																																																																															
	A1-2 left	1	38	38																																																																																																																															
	A1-2 right	1	43	28																																																																																																																															
	A1-3	1	43	28																																																																																																																															
	A1-5	1	43	28																																																																																																																															
	F1-2	1	54,5	22																																																																																																																															
	F2-4	1	60,4	32																																																																																																																															
	F2-5	1	42,3	18																																																																																																																															
	F2-6	1	53,3	22																																																																																																																															
	K2-6	1	44,7	28																																																																																																																															
	K2-7	1	44,7	25																																																																																																																															
	K2-15	1	44,7	20																																																																																																																															
	K3-9	1	80	40																																																																																																																															
	K3-1	1	55,1	36																																																																																																																															
	K3-18	1	55,1	36																																																																																																																															
Data on the equipment for the performance of teaching and research activities	Number of classrooms with computer and capacity of computer workplaces 10 classrooms with total 274 workplaces																																																																																																																																		

	<table><tr><th>no.</th><th>Types of didactic space numeration</th><th>Number of premises</th><th>Area square metres</th><th>Total seating capacity</th></tr><tr><td>1</td><td>Computer rooms</td><td>10</td><td>391</td><td>274</td></tr><tr><td></td><td>Room 309</td><td>1</td><td>75</td><td>25</td></tr><tr><td></td><td>Room 312 Web Lab</td><td>1</td><td>75</td><td>25</td></tr><tr><td></td><td>Computer center 1</td><td>1</td><td>79</td><td>30</td></tr><tr><td></td><td>Computer center 2</td><td>1</td><td>84</td><td>44</td></tr><tr><td></td><td>Room K1-2</td><td>1</td><td>47,4</td><td>24</td></tr><tr><td></td><td>Room K1-3</td><td>1</td><td>47,4</td><td>24</td></tr><tr><td></td><td>Room K2-8</td><td>1</td><td>48,3</td><td>40</td></tr><tr><td></td><td>Room K3-18 Idea.lab</td><td>1</td><td>44,7</td><td>12</td></tr><tr><td></td><td>Room F1-1</td><td>1</td><td>35</td><td>22</td></tr><tr><td></td><td>Room A1-4</td><td>1</td><td>43</td><td>28</td></tr></table> 2. Number of laboratories for practical teaching, research and internships - 21 divided in 12 research areas 3. Equipment for performing higher education activities- Equipment value according the accounting rules is 33.829.470,00 EUR	no.	Types of didactic space numeration	Number of premises	Area 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 K1-2	1	47,4	24		Room K1-3	1	47,4	24		Room K2-8	1	48,3	40		Room K3-18 Idea.lab	1	44,7	12		Room F1-1	1	35	22		Room A1-4	1	43	28
no.	Types of didactic space numeration	Number of premises	Area 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 K1-2	1	47,4	24																																																									
	Room K1-3	1	47,4	24																																																									
	Room K2-8	1	48,3	40																																																									
	Room K3-18 Idea.lab	1	44,7	12																																																									
	Room F1-1	1	35	22																																																									
	Room A1-4	1	43	28																																																									
Total number of students for whom previous credentials have been obtained	3050 students at all programs (2020-2024)																																																												
Number of students (first time enrolled)	162 at 2024/25 academic year (first cycle) 16 at 2024/25 academic year (second cycle) 2 at 2024/25 academic year (third cycle)																																																												
Number of persons in teaching-scientific, scientific and teaching professions	Structure of the teaching staff in teaching science, research, teaching, and associate titles Full professor 43 Associate professor 6 Assistant professor 10																																																												
Number of people in associate positions	Teaching Assistant 14																																																												
Teacher:student ratio (number of students per teacher)	3050 / 59 = 51 (2020-2024)																																																												
Space ratio: students (m ² per student)	11.2 m ² per student																																																												
Internal mechanisms for ensuring and controlling the quality of studies	Internal mechanisms for ensuring and controlling the quality of studies: - the development of teaching contents, - the implementation of the teaching process, - the assessment of students, - the preparation of a graduation thesis, - assessment of the quality of teaching by students with surveys at the end of each semester for each subject, - evaluation of the quality of the study program by the students during the awarding of the diploma, - other procedures related to the resources and logistics of the teaching process, - conducting an internal evaluation (self-evaluation). Self-evaluation is carried out as a process of self-evaluation at the level of study programs, as well as self-evaluation at the level of the entire Faculty. The self-evaluation is carried out by a commission formed by the Teaching and Research Council, consisting of seven members, five of whom are teachers, and two members are students. Segments of the self-evaluation expressed through SWOT analysis: SWOT analysis of the first cycle studies, SWOT analysis of the second cycle studies, SWOT analysis of the third cycle studies, SWOT analysis of the teaching and associate staff, SWOT analysis for spatial and material resources, SWOT analysis for the logistics of the Faculty of Engineering - Skopje, SWOT analysis for the international cooperation of the Faculty of Engineering - Skopje, SWOT analysis for the scientific research activity, SWOT analysis for funding. • Rating the quality of teaching by students with surveys at the end of each semester for each subject/course, • Evaluate the quality of the study program by the students in the award ceremony of the diploma – graduation ceremony																																																												

	Other procedures relating to resources and logistics of the teaching process. Self evaluation process – report published on the web site. Link https://www.mf.ukim.edu.mk/mk/content/%D1%80%D0%B5%D0%B7%D1%83%D0%BB%D1%82%D0%B0%D1%82%D0%B8-%D0%BE%D0%B4-%D0%B0%D0%BD%D0%BA%D0%B5%D1%82%D0%B8%D1%81%D0%B0%D0%BC%D0%BE%D0%B5%D0%B2%D0%B0%D0%BB%D1%83%D0%B0%D1%86%D0%B8%D1%98%D0%B0
Frequency of the self-evaluation process (every year, every two years, every three years) and date of the last self-evaluation	<u>Every three years</u> Latest – 2023
Data on the last conducted external evaluation of the institution	2017 The last external evaluation of the University was conducted from 16 to 20 October 2017 by an expert team nominated by the European Association of Universities, in Brussels. The evaluation report is available on the website http://ukim.edu.mk/mk_content.php?meni=155&glavno=1
Other data that the Institution wants to state as an argument for its success	Number of graduates of: Undergraduate studies (VII/1 degree – higher education) 4650 Undergraduate studies (VI/1 degree – higher education) 1296 Postgraduate studies (VII/2 degree – masters) 292 Doctor of Science (application by topic) 151 Undergraduate and first cycle four-year studies after ECTS 1979 Undergraduate and first cycle three-year studies in ECTS 671 Second cycle of studies after ECTS 493 Third cycle of studies – doctoral studies 29 Interdisciplinary Studies in Environmental and Resource Engineering First cycle of studies 18 Second cycle of studies 5

1. 2 . Map of a higher education institution - for interdisciplinary studies - participants in the study program

Name of the higher education institution	In Macedonian language	N/A
	In English	
	In the language in which the teaching is conducted	
Headquarters		
Webpage		
Type of higher education institution (public, private, private-public)		
Data on the last accreditation		
Field of study or artistic discipline according to the International Standard Classification of Education of UNESCO (MSCOB, ISCED) and scientific research areas (According to the International Frascati Classification of 2015) for which accreditation has been obtained		
Data on international cooperation on the teaching plan, scientific research work and student mobility		

Data on the space intended for the performance of teaching and research activities	
Data on the equipment for the performance of teaching and research activities	
Total number of students for whom previous credentials have been obtained	
Number of students (first time enrolled)	
Number of persons in teaching-scientific, scientific and teaching professions	
Number of people in associate positions	
Teacher:student ratio (number of students per teacher)	
Space ratio: students (m ² per student)	
Internal mechanisms for ensuring and controlling the quality of studies	
Frequency of the self-evaluation process (every year, every two years, every three years) and date of the last self-evaluation	
Data on the last conducted external evaluation of the institution	
Other data that the Institution wants to state as an argument for the success of a higher education institution participating in the realization of the study program	

2 . DATA ON THE ORGANIZATION UNIT OF THE STUDY PROGRAM

1	Unit of a higher education institution (unit of the University)	In Macedonian language	Машински факултет - Скопје
		In English	Faculty of Mechanical engineering - Skopje
		In the language in which the teaching is conducted	Машински факултет - Скопје
2	Headquarters		Rugjer Boshkovikj 18, P.O.Box 464, 1000 Skopje
3	Study and scientific research area in which the unit is accredited according to the International Standard Classification of Education of UNESCO (MSCOB, ISCED).		
4	Scientific research area for which the unit is accredited according to Frascati's classification		2. Technical-technological field
5	Type of studies (academic or professional) developed at the unit		Academic study programs
6	Study programs within the unit		First cycle of studies Production engineering Accreditation decision: number 08-113/6 of 25.07.2022 Motor vehicles, transport, mechanization and logistics Accreditation decision: number 08-116/4 of 25.07.2022 Thermal engineering Accreditation decision: number 08/-117/6 of 25.07.2022 Hydraulic Power Engineering Accreditation decision: number 08-118/6 of 25.07.2022 Industrial Engineering and Management

		Accreditation decision: number 08-114/4 of 25.07.2022 Automation and control systems Accreditation decision: number 08-120/6 of 25.07.2022 Energy and ecology Accreditation decision: number 08-119/6 of 25.07.2022 Mechatronics Accreditation decision: number 08-121/7 of 25.07.2022 Industrial design Accreditation decision: number 08-122/6 of 25.07.2022 Materials, processes and innovations Accreditation decision: number 08-115/6 of 25.07.2022 Second cycle of studies (one-year) Sustainable energy and environment Accreditation decision: number 1409-1/4 of 24.09.2020 Product life cycle management Accreditation decision: number 1409-2/4 of 30.10.2020 Materials, Welding and Structural Engineering Accreditation decision: number 08-162/7 of 16.09.2024 Transport, mechanization and logistics Accreditation decision: number 08-168/7 of 01.10.2024 Thermal power engineering Accreditation decision: number 08-169/7 of 16.09.2024 Automation and Fluid Engineering Accreditation decision: number 08-167/7 of 01.10.2024 Motor vehicles Accreditation decision: number 08-171/9 of 01.10.2024 Industrial Engineering and Management Accreditation decision: number 08-164/7 of 01.10.2024 Energy and environment Accreditation decision: number 08-166/7 of 16.09.2024 Mechatronics Accreditation decision: number 08-159/7 of 01.10.2024 Advanced production systems and technologies Accreditation decision: number 08-170/7 of 01.10.2024 Mechanics and machine systems Accreditation decision: number 08-160/7 of 01.10.2024 Industrial design Accreditation decision: number 08-165/7 of 16.09.2024 Lean management
--	--	--

		Accreditation decision: number 08-163/7 of 01.10.2024 Management of occupational health and safety systems Accreditation decision: number 08-949/6 of 21.03.2023 Management and Quality Control Accreditation decision: number 08-575/4 of 21.10.2022 Third cycle of studies Mechanical engineering Accreditation decision: number 08-191/4 of 21.07.2021 Industrial Engineering and Management Accreditation decision: number 08-190/6 of 18.08.2021
7	Cycle of education (first or second cycle of studies, or integrated first with second cycle of studies and third cycle)	First and second cycle of studies
8	Total number of students for whom previous credentials have been obtained	2020-2024 3050 students
9	Number of students (first time enrolled)	162 at 2024/25 academic year (first cycle) 16 at 2024/25 academic year (second cycle) 2 at 2024/25 academic year (third cycle)
10	Number of persons in teaching-scientific, scientific and teaching professions	59
11	Number of people in associate positions	14
12	Teacher:student ratio (number of students per teacher)	17

Table 2.1. List of persons selected in teaching-scientific positions in a full -time employment relationship at a unit (faculty) that requires (re)accreditation of the study program (Article 61 of the Law on Higher Education, "Official Gazette of the Republic of Macedonia", no. 82 /2018)

	Name and surname of the teacher	Teaching-scientific title
1	Kocho Angjushev	Full Professor
2	Zoran Bogatinski	Full Professor
3	Marjan Gavriloski	Full Professor
4	Viktor Gavriloski	Full Professor
5	Valentina Gechevska	Full Professor
6	Atanas Kochov	Full Professor
7	Dame Korunoski	Full Professor
8	Robert Minovski	Full Professor
9	Aleksa Malcheski	Full Professor
10	Radmil Polenakovikj	Full Professor
11	Zoran Pandilov	Full Professor
12	Dobre Runchev	Full Professor
13	Valentino Stojkovski	Full Professor
14	Sofija Sidorenko	Full Professor
15	Atanasko Tuneski	Full Professor
16	Laze Trajkovski	Full Professor
17	Risto Tashevski	Full Professor
18	Jasmina Chaloska	Full Professor

19	Dushan Chakmakov	Full Professor
20	Gligorche Vrtanoski	Full Professor
21	Nikola Tuneski	Full Professor
22	Zlatko Petreski	Full Professor
23	Petar Simonovski	Full Professor
24	Viktor Stojmanovski	Full Professor
25	Done Tashevski	Full Professor
26	Risto Filkoski	Full Professor
27	Darko Danev	Full Professor
28	Igor Gjurov	Full Professor
29	Hristijan Mickoski	Full Professor
30	Zoran Markov	Full Professor
31	Dame Dimitrovski	Full Professor
32	Ana Lazarevska	Full Professor
33	Emilija Celakoska	Full Professor
34	Vasko Sharevski	Full Professor
35	Filip Mojsovski	Full Professor
36	Emil Zaev	Full Professor
37	Darko Babunski	Full Professor
38	Mite Tomov	Full Professor
39	Bojan Prangoski	Full Professor
40	Kristina Jakimovska	Full Professor
41	Bojan Jovanovski	Full Professor
42	Ile Mircheski	Full Professor
43	Tashko Rizov	Full Professor
44	Nikola Avramov	Associate professor
45	Elisaveta Doncheva	Associate professor
46	Filip Zdraveski	Associate professor
47	Viktor Iliev	Associate professor
48	Mirko Petrushevski	Associate professor
49	Igor Shesho	Associate professor
50	Marjan Djidrov	Assistant professor
51	Vase Janushevska	Assistant professor
52	Jelena Djokikj	Assistant professor
53	Trajche Velkovski	Assistant professor
54	Tomi Dimovski	Assistant professor
55	Elena Angeleska	Assistant professor
56	Simona Domazetovska Markovska	Assistant professor
57	Marija Lazarevikj	Assistant professor
58	Aleksandar Gjerassimovski	Assistant professor
59	Maja Anachkova	Assistant professor

3 . BASIC INFORMATION ABOUT THE STUDY PROGRAM

1	Name of the study program	In Macedonian language	ОДРЖЛИВА ЕНЕРГЕТИКА И ЖИВОТНА СРЕДИНА
		In English	SUSTAINABLE ENERGY AND ENVIRONMENT
		In the language in which the teaching is conducted	SUSTAINABLE ENERGY AND ENVIRONMENT
2	Fields of study or artistic disciplines of first, second and third level according to the International Standard Classification of Education of UNESCO (MSCOB, ISCED). For interdisciplinary study programs, the corresponding fields of study or art disciplines of first, second and third level are indicated	A wider area	07 Engineering,manufacturing and construction
		Narrower area	071 Engineering and engineering trades
		Detailed area	0712 Environmental protection technology 0713 Electricity and energy
3	Frascati's classification (for determining appellation)	Scientific area	2 Technical and technological sciences
		Scientific field	205 Energy 214 Mechanical engineering 225 Environment
			20500 Energy and process engineering (Heat exchange; Multiphase systems) 20501 Theory and construction of power machines (Steam generators; Thermal turbines) 20502 Theory and design of power plants 20503 Mathematical modeling and simulation of energy processes 20504 Thermotechnics and Thermotechnical Devices and Plants 20505 Unconventional energy sources and technologies 20506 Rational energy use 20507 Internal Combustion Engines 20508 Propulsion Materials (Fuels and Energy Conversion Technologies) 20509 Heating, Air Conditioning and District Heating Systems 20510 Refrigeration Technology and Systems

			20511 Technical Thermodynamics 20513 Nuclear energy 20514 Other 21420 Fluid mechanics and fluid flow systems 21421 Hydropower Engineering 21422 Automation 21423 Regulation technics 22500 Environment 22502 Water, Air and Soil 22505 Energy 22506 Waste materials 22507 Other
4	National Classification of Occupations	Main groups	2 Experts and scientists
		Subgroups	21 Experts for science and engineering
		Subgroups	214 Experts for engineering sciences
		Single groups	2144 Mechanical engineering
5	Type of studies (academic or professional)		Academic
6	Cycle of education (first or second cycle of studies, or integrated first and second cycle of studies)		Second cycle academic study program
7	Load of the study program expressed in ECTS credits and if preparatory courses are provided		60 ECTS
8	Value in ECTS credits of the final work of professional and academic undergraduate and postgraduate studies		
9	Duration of studies (in years and semesters of the duration of the study program)		1 academic year
10	Data on whether the study program is being submitted for accreditation or for the extension of previous accreditation		Extension of previous accreditation
11	Method of financing the proposed study program, and for private and private-public non-profit higher education and scientific institutions, proof of provided quality financial guarantee for the referee program		Self-financing from students, according to the Law for Higher education in Macedonia
12	Degree or level of qualification required for enrollment in studies according to the National Qualifications Framework		VII A
13	Conditions for enrolling in the study program especially for full-time, part-time and foreign students, which include subjects relevant to the study program from the state matriculation or entrance exam with clear, unambiguous and accurate content of the exam, its duration, performance and assessment		Previous first cycle of study with minimum 240 ECTS in the field of technical – technological sciences
14	A degree or level of qualification obtained by completing studies according to the National Qualification Framework		VIIA

15	Academic or professional title that is acquired after completing the study program	In Macedonian language	Магистер на науки од машинство – Одржлива енергетика и животна средина
		In English	Master of science in mechanical engineering – Sustainable Energy and Environment
		In the language in which the teaching is conducted	Master of Science in mechanical engineering – Sustainable Energy and Environment
16	Place of teaching		Faculty of Mechanical engineering – Skopje
17	Number of students planned to enroll in the study program		20 students per year
18	Language in which the teaching will be conducted		Englsih
19	Possibility of teaching in a foreign language (windows of mobility - teaching subjects that can be taught in English)		N/A
20.1	Method of study (full-time, part-time study)		Full time study program
20.2	Rules, opportunities and conditions for part-time study of the study program		N/A
21	Information on continuing education including study and scientific fields for study programs from the second and third cycle of academic or professional studies for which completion of the corresponding study program from the first cycle ensures adequate passability		Third cycle of studies at Engineering study programs at the Faculty of Mechanical Engineering or at any other University with accredited study program in the field of mechanical engineering
22	Academic year in which the implementation of the study program will begin		2025/2026
23	The deadlines for completing the planned activities from the study program		Two years since the enrollment
24	Number and date of Decision (if submitted for re-accreditation)	of the last accreditation by the Accreditation Board	1409-1/4 24.9.2020
		to start working on the study program from MES/AHEQ	08-85/4 23.3.2021

3 . Purpose and justification for introducing the study program

The Faculty of Mechanical Engineering of the 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, there is a constant need for educated personnel who have new interdisciplinary knowledge and successfully respond to global trends. The Institute of Thermal power engineering and the Institute for Hydraulic Engineering and Automation at the 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: Research and optimization of energy systems and installations, management of energy facilities and systems, energy management systems and systems design, construction and operation of power plants, design and construction of thermal machines and plants, technical inspection and control of the design and construction of energy plants and systems, protection of environment. Recognizing the basic profile competencies and acquired qualifications, this study program justifies expectations for analysis, exploration of energy sources, ways of transformation and its efficient use, design and construction of thermal machines and facilities, design and construction of hydropower and hydro-technical installations and machinery, management and exploitation of thermal and hydraulic plants and systems, regulations and testing of thermal and hydraulic machines and plants, technical control and inspection during construction of thermal and hydraulic plants and systems, expertise in the field of thermal and hydraulic machines and plants, regulations and measures to protect the environment.

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 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.

4 . Compliance of the study program with the needs of society for the given personnel profile

The Faculty of Mechanical Engineering in Skopje, within the framework of its determination to improve the educational process, carried out research in the industry used questionnaires consisting of six parts. The distribution of the questionnaire was carried out through the three chambers of commerce (which is particularly important for the scope) and a selected list of companies (proposed by the respective Institute holder and responsible for the study program), which have a more intensive cooperation with the respective

Institute. One part of the questionnaire referred to the advanced competencies that the graduates of the Energy and Environment department should have.

According to the survey conducted, the industry declared itself with the highest rating for the competence "Application of knowledge in the field of energy and environment". Bearing in mind that the second cycle of studies is a continuation of the first cycle of studies, the statement about the industry's need for such a staff profile will fully apply to the Sustainable Energy and Environment study program.

5 . National Framework of Qualifications level, study program Sustainable energy and environment, Ss. Cyril and Methodius University in Skopje, Faculty of Mechanical Engineering - Skopje, in accordance with the Regulation on the national framework of higher education qualifications

Level National qualification framework for higher education		High education Second cycle study program	Level of the European qualification framework
V II	A B		
		VII A	7

6 . Study program objectives and learning outcomes that indicate the successful completion of the second cycle of studies (60 ECTS) and are awarded to a person who meets the following qualification descriptors:

6. a. General descriptors of qualifications for the second cycle of one year studies with 60 ECTS, for the study program submitted for (re)accreditation , in accordance with the Decree on the national framework of higher education qualifications

Descriptor type	Description
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, organizational 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 scientific research and new sources of knowledge.
Application of 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.

Assessment ability	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.
Study skills	Takes initiative to identify the needs for acquiring further knowledge and learning with a high degree of autonomy.

6. b. Specific descriptors of qualifications for the second cycle of one year studies with 60 ECTS, for the study program submitted for (re)accreditation, in accordance with the Decree on the national framework of higher education qualifications

Descriptor type	Description
Knowledge and understanding	Shows thorough knowledge and understanding in scientific research fields and areas acquired in the second cycle and relate to: • Knowledge of energy sources, ways of transformation and its efficient use • Operation and maintenance of power plants • Regulations and testing of machines and power plants • Technical control, supervision and inspection during the construction of power plants and systems • Development of expert reports on energy machinery and equipment • Knowledge of techniques, rules and measures to protect the environment.
Application of 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.
Assessment ability	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 Sustainable Energy and Environment, 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.
Study 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.

7 . Determined ratio between mandatory and optional subjects, with a list of mandatory subjects, a list of optional subjects and a defined way of choosing the subjects.

STRUCTURE OF THE STUDY PROGRAM

Table 7.1. Schedule of subjects by semesters and years of study for **academic studies (AS)**

Serial Number	Subject code	Title of the subject/course	Semester	Weekly fund of classes		ECTS
				P	C	
FIRST YEAR – first semestar						
1	OMI1001	Selected Topics in Mathematics and Informatics	I/winter	2	2	6
2	EE1202	Modeling and Simulations of Energy Systems	I/winter	2	2	6

3	SEE1101	Advanced Course in Energy Transformation	I/winter	2	2	6
4		Basic elective course	I/winter	2	2	6
5		Basic elective course	I/winter	2	2	6
Total hours (lectures/exercises) and ECTS for the year				10	10	30

Serial Number	Subject code	Name the subject	Semester	Weekly fund of classes		ECTS
				P	C	
FIRST YEAR – second semester						
1	SEE1201	Experts in Teamwork	I/ summer	2	2	6
2		Specific Elective Course	I/ summer	2	2	6
3		Master's Thesis	I/ summer	/	/	18
Total hours (lectures/exercises) and ECTS for the year				4	4	30

Table 7.2 . Electives and subjects of the study program (the list includes the elective subjects of the study program and teaching subjects that are performed at another unit of the university, in accordance with Article 139 paragraph 9 of the Law on Higher Education) (Official Gazette of the Republic of Macedonia 82/18))

A Serial Number	Code	Title of the subject	Semester	Weekly fund of classes		ECTS	From which unit
				lectures	exercises		
1	TEI2113	Thermal power plants – advanced level 1	I/winter	2	2	6	Faculty of Mechanical Engineering - Skopje
2	TEI1101	Advanced hermodynamics – selected chapters	I/winter	2	2	6	Faculty of Mechanical Engineering - Skopje
3	EE2104	Transport and the environment	I/winter	2	2	6	Faculty of Mechanical Engineering - Skopje
4	SEE2101	Fluid mechanics in environmental engineering	I/winter	2	2	6	Faculty of Mechanical Engineering - Skopje
5	SEE2102	Environmental measurement methods and monitoring systems	I/winter	2	2	6	Faculty of Mechanical Engineering - Skopje
6	SEE2103	Environmental systems analysis	I/winter	2	2	6	Faculty of Mechanical Engineering - Skopje
7	SEE2104	An Introduction to Eco-innovations	I/winter	2	2	6	Faculty of Mechanical Engineering - Skopje
8	TEI2226	Energy economics	I/summer	2	2	6	Faculty of Mechanical Engineering - Skopje
9	SEE2201	Water and waste water treatment	I/summer	2	2	6	Faculty of Mechanical

							Engineering - Skopje
10	SEE2202	Energy efficiency	I/summer	2	2	6	Faculty of Mechanical Engineering - Skopje
11	SEE2203	Eco-engines	I/summer	2	2	6	Faculty of Mechanical Engineering - Skopje
12	SEE2204	Design of fluid conveying and hydro power system	I/summer	2	2	6	Faculty of Mechanical Engineering - Skopje
13	SEE2205	Waste management	I/summer	2	2	6	Faculty of Mechanical Engineering - Skopje
14	SEE2206	Energy vs. sustainable development: Concepts and aspects	I/summer	2	2	6	Faculty of Mechanical Engineering - Skopje
15	SEE2207	Automation of environmental processes	I/summer	2	2	6	Faculty of Mechanical Engineering - Skopje
16	SEE2208	Clean energy technologies	I/summer	2	2	6	Faculty of Mechanical Engineering - Skopje
17	SEE2209	Experts in Teamwork (EiT)	I/summer	2	2	6	Faculty of Mechanical Engineering - Skopje
18	SEE2210	Hidden hydropower technologies	I/summer	2	2	6	Faculty of Mechanical Engineering - Skopje
19	SEE2211	HVAC, refrigeration and heat pump technology	I/summer	2	2	6	Faculty of Mechanical Engineering - Skopje
20	SEE2212	Sustainable, Green and Just Energy Transition: Concepts and Aspects	I/summer	2	2	6	Faculty of Mechanical Engineering - Skopje
Total :						120	

Table 7.3. Mobility windows - teaching subjects that can also be taught in English according to Article 139 paragraph 10 of the Law on Higher Education ("Official Gazette of the Republic of Macedonia" no. 82/18)

	Name of subject	A teacher	Year/ Year	Is KTS
1.	N/A			

The study program is created and will be realized in English language, which gives 100% possibilities for mobility windows!

Table 7.4. Overview of representation of compulsory courses and the elective subjects of the study program.

Semester	Number of compulsory subjects	Number of elective courses	Total subjects
I	3	2	5
II	1	1	2
In total	4	3	7
% representation	57	43	100 %

Table 7.5. Overview of the percentage representation of compulsory courses and the optional subjects.

Row no	Duration of studies (years)/ total number of ECTS of the study program	Total load expressed through ECTS		Load for optional subjects expressed through ECTS	
		A Total number of ECTS of the study program	A1 Percentage representation of ECTS from the teaching subjects of the study program	B Total number of ECTS from elective subjects	B1 Percentage representation of ECTS from elective subjects in relation to the total number of ECTS in the study program
1.	1 year 60 E KTS	60	100%	18	$(B/A)*100= 30 \%$

7.1. Rules and method of choosing elective subjects with the possibility of choosing subjects from other accredited study programs

Method of choosing elective subjects from the study program
The students have the opportunity to choose the elective course from the list in accordance to the topic of the master research and master thesis. It is strongly recommended to make the choice of elective courses in coordination with the study program coordinator and the master thesis supervisor. It is strongly recommended that one professor could not have more than two courses with one student.
Method of choosing elective subjects from the university list
The students can choose the elective course – maximum two, from the list of offered elective courses from all other study programs offered by the Faculty of Mechanical engineering or within the study programs of the Ss Cyril and Methodius University in Skopje in accordance with the topic of the master research and master thesis. It is strongly recommended to make the choice of elective courses in coordination with the study program coordinator and the master thesis supervisor. It is strongly recommended that one professor could not have more than two courses with one student.

7.2. Deadlines for completing the planned activities of the study program

The deadline is ten years from the starting academic year and semester when the study program starts with activities.

8. List of teaching staff with data specified in Article 7 (Annex No. 4) of the Rulebook on the content of study programs ("Official Gazette of the Republic of Macedonia", No. 79/2023) and Article 61 paragraph 3 of the Law on Higher Education ("Official Gazette of the Republic of Macedonia", No. 82/2018)

Table 8.1 List of persons selected in teaching-scientific, scientific and teaching positions in regular full-time employment of the unit, which will participate in the implementation of the study program

	Name and surname of the teacher	to state		Title of the subject (from Table 7.1 and 7.2)	Total number of subjects	
		<i>the title in which was chosen and in which scientific field</i>	<i>The field in which he received his doctorate</i>		win ter	sum mer
1	Done Tashevski	Full professor, PhD, Mechanical Engineering	Energetic, Fuel cells	Modeling and Simulations of Energy Systems, Advanced Course in Energy Transformation, Thermal power plants – advanced level 1, Energy efficiency	3	1
2	Risto Filkoski	Full professor, PhD, Mechanical Engineering	Power Engineering, Mathematical modelling and simulation of energy processes	Modeling and Simulations of Energy Systems, Advanced Course in Energy Transformation, Advanced Thermodynamics - selected chapters, Clean energy technologies	3	1
3	Zoran Markov	Full professor, PhD, Mechanical Engineering	Mechanical Engineering, Hydro energy	Modeling and Simulations of Energy Systems, Advanced Course in Energy Transformation, Fluid Mechanics in Environmental Engineering, Water and Waste Water Treatment, Design of fluid conveying and hydro power system	3	2
4	Ana Lazarevska	Full professor, PhD, Mechanical Engineering	Mechanical Engineering, Environmental protection	Modeling and Simulations of Energy Systems, Energy vs. Sustainable Development: Concepts and Aspects, Sustainable, Green and Just Energy Transition: Concepts and Aspects	1	2
5	Atanasko Tuneski	Full professor, PhD, Mechanical Engineering	Mechanical Engineering, Control Systems	Modeling and Simulations of Energy Systems, Advanced Course in Energy Transformation, Environmental Systems Analysis	3	0
6	Dame Dimitrovski	Full professor, PhD, Mechanical Engineering	Thermoenergy, IC engines and environment	Modeling and Simulations of Energy Systems, Advanced Course in Energy Transformation, Experts in Teamwork (EiT), Transport and the environment, Eco-engines, Waste management	3	3
7	Darko Babunski	Full professor, PhD, Mechanical Engineering	Mechanical Engineering, Control Systems	Modeling and Simulations of Energy Systems, Environmental Measurement	2	1

				methods and Monitoring Systems, Automation of environmental processes		
8	Emil Zaev	Full professor, PhD, Mechanical Engineering	Mechanical Engineering, Control Systems	Modeling and Simulations of Energy Systems, Automation of environmental processes	1	1
9	Igor Shesho	Associate professor, PhD, Mechanical Engineering	Renewable energy, Solar energy	Advanced Course in Energy Transformation, Energy economics	1	2
10	Viktor Iliev	Associate professor, PhD, Mechanical Engineering	Mechanical Engineering, Fluid mechanic and fluid flow systems	Advanced Course in Energy Transformation	1	0
11	Marija Lazarevikj	Assistant professor, PhD, Mechanical Engineering	Mechanical Engineering, Fluid mechanic and fluid flow systems	Hidden hydropower technologies	0	1
12	Aleksandar Gjerassimovski	Assistant professor, PhD, Mechanical Engineering	Mechanical Engineering, Thermotechnics and thermotechnical devices and plants	HVAC, refrigeration and heat pump technology	0	1
13	Nikola Tuneski	Full professor, PhD, Mathematics	Mathematics, Complex analysis	Selected topics in Mathematics and Informatics	1	0
14	Aleksa Malcheski	Full professor, PhD, Mathematics	Mathematics, Functional analysis	Selected topics in Mathematics and Informatics	1	0
15	Bojan Prangoski	Full professor, PhD, Theoretical Mathematics	Theoretical Mathematics, Functional Analysis	Selected topics in Mathematics and Informatics	1	0
16	Atanas Kochov	Full professor, PhD, Mechanical Engineering	Mechanical Engineering, Composite Materials	An Introduction to Eco-innovations	1	0
In total					25	15

Table 8.2 List of persons selected in teaching-scientific, scientific and teaching positions in regular full-time employment **from other units of the higher education institution** engaged in the unit where the study program is implemented

Row no	Name and surname of the teacher	to state			Title of the subject (from Table 7.1 and 7.2)	Total number of subjects taught per unit and cold. program	
		<i>the title in which was chosen and in which scientific field</i>	<i>The field in which he received his doctorate</i>	<i>unit where works in regular employment</i>		winter	summer
1							
2							
3							
In total							

Table 8.3 List of persons selected in teaching-scientific, scientific and teaching positions in employment in **another higher education institution** or other institution (private or public non-educational) engaged in the unit where the study program is implemented

Rb	Name and surname of the teacher	to state			Title of the subject (from Table 7.1 and 7.2)	Total number of subjects		Working relation
		<i>the title in which was chosen and in which scientific field</i>	<i>The field in which he received his doctorate</i>	<i>the institution where the employment relationship is based</i>		winter	summer	
1								
2								
3								
4								
5								
In total								

Table 8.4. Number of teachers needed to implement the higher education activities of the study program (Article 28 of the Rulebook on Standards and Norms for the Establishment and Performance of Higher Education Schools, "Official Gazette of the Republic of Macedonia", No. 245/2022)

Row no.	Teachers involved in the realization of the study program	A	B	C	G	Number of lessons per teacher - per year ¹ (Bx15) x G
		Number of teaching subjects	Total No of hours of classes by subject	Number of students for whom accreditation is sought	Number of students in the group for lectures and exercises for full-time students ²	
1	Done Tashevski	1 or 2 out of 4	4 or 8	20	Max 1 group of students, Number of student for the group is max 20	60 or 120
2	Risto Filkoski	1 or 2 out of 4	4 or 8			60 or 120
3	Zoran Markov	1 or 2 out of 5	4 or 8			60 or 120
4	Ana Lazarevska	1 or 2 out of 3	4 or 8			60 or 120
5	Atanasko Tuneski	1 or 2 out of 3	4 or 8			60 or 120
6	Dame Dimitrovski	1 or 2 out of 6	4 or 8			60 or 120
7	Darko Babunski	1 or 2 out of 3	4 or 8			60 or 120
8	Emil Zaev	1 or 2 out of 2	4 or 8			60 or 120
9	Igor Shesho	1 or 2 out of 3	4 or 8			60 or 120
10	Viktor Iliev	0 or 1	0 or 4			0 or 60
11.	Marija Lazarevikj	0 or 1	0 or 4			0 or 60
12.	Aleksandar Gjerassimovski	0 or 1	0 or 4			0 or 60
13.	Atanas Kochov	0 or 1	0 or 4			0 or 60

¹ Number of weeks in a semester. If the subjects are taught in two semesters, 30 weeks are recorded, i.e. one academic year.

² The size of the group for lectures and exercises is obtained in such a way that the number of students for whom accreditation is requested is collected depending on the size of the group provided for lectures and exercises in accordance with Article 35 of the Rulebook on Standards and Norms for the Establishment and Performance of Higher Education Activities, ("Official Gazette of the Republic of Macedonia", no. 245 /20 22) ex. lecture group – a maximum of 100 students is considered as one group . If the determined number increases by 50%, a new lecture group is opened and 2 is written in column "G".

14	Aleksa Malcheski	0 or 1	0 or 4			0 or 60
15	Nikola Tuneski	0 or 1	0 or 4			0 or 60
16	Bojan Prangoski	0 or 1	0 or 4			0 or 60

9 . List of provided required number of non-teaching staff, in accordance with Article 13 of the Rulebook on Standards and Norms for the Establishment and Performance of Higher Education Activities (Official Gazette of the Republic of North Macedonia No. 245/22)

Table. 9 .1. A summary of non-teaching / administrative staff by title and jobs at the higher education institution (faculty , i.e. higher vocational school)

Ord. number	Job description	Qualification	Number of persons
1.	Library	Higher education	1
2.	Student Department questions	Higher education	5
3.	Service for auxiliary - technical staff	Higher education	10
4.	Service for material and financial operations	Higher education	4
5.	Service for general and legal affairs	Higher education	3
6.	Information System Executive	Higher education	1

10 . Data on the space provided for the realization of the Study Program Sustainable Energy and Environment organized on the Faculty of Mechanical Engineering in accordance with Article 20 of the Rulebook on Standards and Norms for the Establishment and Performance of Higher Education Activities ("Official Gazette of the Republic of North Macedonia No. 245/22)

Table 10. List of rooms with surface area available to the higher education institution (faculty i.e. higher professional school)

R.B.	Type and purpose of space	Number	Number of seats	Area m ²
1.	Amphitheatres and lecture halls	2	480	426
2.	Laboratories	21	250	2192
3.	Cabinets for the teaching staff	83+12	150	1736
4.	Offices and rooms for non-teaching staff	15	50	475
5.	Premises for work of the organs and bodies of the higher education institution	2		125
6.	Premises for student assembly work	/		
7.	Other common and multipurpose rooms: meeting rooms,	2		125
8.	Library, reading room	1+1		
9.	Hygienic and sanitary knots,	15		
10.	Rooms for reception of visitors,	5		
11.	Corridors , warehouses, pantry, archives, elevators, stairs and more	40		
12.				
In total				9918

11 . List of equipment and IT - technical resources provided for the realization of the study program Sustainable Energy and Environment, Faculty of Mechanical Engineering, in accordance with Annex 2 of ³the Rulebook on Standards and Norms for the Establishment and Performance of Higher Education Activities ("Official Gazette of the Republic of North Macedonia" No. 245/22)

Table 11.1 List of equipment and teaching aids (by type, number and purpose) for performing the activity that correspond to the norms and standards for performing higher education activity.

No.	Equipment and teaching aids	Type	Purpose	Quantity
1.	Hydraulic system for measurements of small turbines	Laboratory	Laboratory exercises, research work	1
2.	System for laboratory tests of fluidized bed combustion (defining the flow and the temperature in the combustion of solid fuels in fluidized bed)	Laboratory	Laboratory exercises, research work	1
3.	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)	Laboratory	Laboratory exercises, research work	1
4.	Machines from the field of pneumatics, electro-pneumatics, hydraulics, electro-hydraulics, proportional hydraulics and application of computers in programmable memory control	Laboratory	Laboratory exercises, research work	1
5.	Measuring Amplifier instrument for dynamical measurements HBM KWS/6A-5	Laboratory	Laboratory exercises, research work	1
6.	Measuring Amplifier instrument for dynamical measurements HBM type KWS 673.D4.	Laboratory	Laboratory exercises, research work	1
7.	Multi-channel measurement instrument HBM type 3835A (6 x UM3301A)	Laboratory	Laboratory exercises, research work	1
8.	Instrumentation Data Acquisition Tape Recorder HP 3964A and HP 3968A	Laboratory	Laboratory exercises, research work	1
9.	Two-channel Oscilloscope HBM type H2B.13A	Laboratory	Laboratory exercises, research work	1
10.	Spectrum Analyzer HP 3582A	Laboratory	Laboratory exercises, research work	1
11.	Six-channel electronic writer RIKADENKI type R65 with RS232 interface	Laboratory	Laboratory exercises, research work	1
12.	Two-coordinate electronic writer HP type 7015B	Laboratory	Laboratory exercises, research work	1
13.	Set for application of measure gauges HBM- DAK2	Laboratory	Laboratory exercises, research work	1

³ Each higher education institution (university, faculty and higher vocational school) submitting the report adjusts Table 10 depending on the content noted in Appendix 2 in accordance with the affiliation of the unit to a scientific research area and field from the Rulebook on Standards and Norms for the Establishment and Conduct of Higher Education activity (Official Gazette of the Republic of North Macedonia no. 245/22).

14.	Measuring amplifier for no contact measure of torque HBM-BLM	Laboratory	Laboratory exercises, research work	1
15.	Five-channel measure amplifier-acquisition system DMC- SHARP	Laboratory	Laboratory exercises, research work	1
16.	PC computer with built-in A/D (D/A) cards NATIONAL INSTRUMENTS type AT -MIO-16	Laboratory	Laboratory exercises, research work	1
17.	Interfaces for online signal processing and equipment control	Laboratory	Laboratory exercises, research work	1
18.	XS Plotter ROLLAND- DXS.880	Laboratory	Laboratory exercises, research work	1
19.	Six-channel measuring amplifier instrument for static and quasi static measurements HBM- UPM60	Laboratory	Laboratory exercises, research work	1
20.	Junction box HBM-BT21 93	Laboratory	Laboratory exercises, research work	1
21.	Strain gauges for tensometric testing (HBM и PHILIPS) of different types	Laboratory	Laboratory exercises, research work	1
22.	Inductive transducers for displacement HBM type W20 (1), W50 (2) and W100 (4)	Laboratory	Laboratory exercises, research work	1
23.	Inductive transducer for acceleration HBM type B12 (8)	Laboratory	Laboratory exercises, research work	1
24.	Transmission system transducer - registering pressure force	Laboratory	laboratory exercises, scientific research work	1
25.	Fluid pressure transducer HBM type P11/10; P1/200	Laboratory	laboratory exercises, scientific research work	1
26.	Force transducers HBM type 36X2/1t, 312/50 и 312/200	Laboratory	laboratory exercises, scientific research work	1
27.	Press for inflicting force MF1	Laboratory	laboratory exercises, scientific research work	1
28.	Transducers (of different types) for temperature measurement	Laboratory	laboratory exercises, scientific research work	1
29.	Tensometric transducers for measuring torque	Laboratory	laboratory exercises, scientific research work	1
30.	Collector rings and brushes HBM	Laboratory	laboratory exercises, scientific research work	1
31.	Device for measuring the thickness of metal walls (metal sheets);	Laboratory	laboratory exercises, scientific research work	1

32.	Apparatuses and systems for determining physical and chemical characteristics of fuels, lubrication oils, and water;	Laboratory	laboratory exercises, scientific research work	1
33.	Device for examination of surface cracks	Laboratory	laboratory exercises, scientific research work	1
34.	Equipment for dimensional measurement, control of length and angular characteristics, quality of surface, mass and other controls	Laboratory	laboratory exercises, scientific research work	1
35.	Devices for examination of harmful substances in exhaust gasses	Laboratory	laboratory exercises, scientific research work	1
36.	Etalon gasses for comparison and control of gas analyzers	Laboratory	laboratory exercises, scientific research work	1
37.	Tachometer (RPM gauge) ISKRA	Laboratory	laboratory exercises, scientific research work	1
38.	Weighing scales with weight range 50 to 10,000 kg	Laboratory	laboratory exercises, scientific research work	1
39.	Aggregate HONDA 800 for charging the measure instruments when dynamic testing of vehicles are performed	Laboratory	laboratory exercises, scientific research work	1
40.	Computers (DIGITAL, XP, PC), used as servers, graphics and autonomous workstations	Laboratory	laboratory exercises, scientific research work	1
41.	Instruments and devices for vibration measurements (vibration analyser, vibrometer, calibration vibrator etc.)	Laboratory	laboratory exercises, scientific research work	1
42.	Devices for measurement of noise (noise analyser, filter, microphones and other aids)	Laboratory	laboratory exercises, scientific research work	1
43.	Testing stands for protective equipment and shelters (shock wave simulators, flow rate measurements with micromanometers)	Laboratory	laboratory exercises, scientific research work	1
44.	Device for measuring relative humidity and speed	Laboratory	laboratory exercises, scientific research work	1
45.	Chamber for air conditioning on a certain temperature and relative humidity	Laboratory	laboratory exercises, scientific research work	1
46.	Chamber of examination and testing of thermal devices	Laboratory	laboratory exercises, scientific research work	1
47.	Instruments for measuring heat	Laboratory	laboratory exercises,	1

			scientific research work	
48.	Instructional cooling aggregate "Graco" with measurement and regulation devices for thermoenergetic balancing	Laboratory	laboratory exercises, scientific research work	1
49.	Cooling calorimetric aggregates as teaching resource and for balancing	Laboratory	laboratory exercises, scientific research work	1
50.	Forced draught cooling tower with water system, lamellate heat exchanger for water cooling for the air conditioning chamber and thermal testing	Laboratory	laboratory exercises, scientific research work	1
51.	Heat pump model plant	Laboratory	laboratory exercises, scientific research work	1
52.	"Vaporax" steam boiler for fast steam production and burners n	Laboratory	laboratory exercises, scientific research work	1
53.	Device for chemical preparation of water, supply reservoir, etc	Laboratory	laboratory exercises, scientific research work	1
54.	Instruments for exhaust gases analysis	Laboratory	laboratory exercises, scientific research work	1
55.	Engine octane number determining (IT9-2M) using the engine method	Laboratory	laboratory exercises, scientific research work	1
56.	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	Laboratory	laboratory exercises, scientific research work	1
57.	Hand-held devices for water quality measuring Eureka Environmental Manta Multiprobe Logger3.0, Cond Graphite, 4 electrode, Amphibian Display Package	Laboratory	laboratory exercises, scientific research work	1
58.	Ultrasonic flowmeter EESIFLO PORTALOK 7S	Laboratory	laboratory exercises, scientific research work	1
59.	Hiperspectral process photometer spectrolyser	Laboratory	laboratory exercises, scientific research work	1
60.	Data acquisition system constat - industrial process control terminal (900/1800 MHz GSM)	Laboratory	laboratory exercises, scientific research work	1
61.	Laboratory measuring equipment Laboratory Conductivity Meter, Laboratory Oxygen Meter	Laboratory	laboratory exercises, scientific research work	1
	Set for soil testing	Laboratory	laboratory exercises,	1

62.			scientific research work	
63.	GPS – Global Positioning Unit, One Frequency R3 GPS system (base+rover) with post-processing software Trimble Recon	Laboratory	laboratory exercises, scientific research work	1
64.	Zeta-Meter System 3.0+ with Unitron FSB 4X Microscope	Laboratory	laboratory exercises, scientific research work	1
65.	M-CAM 40 - CNC wood processing machine	Laboratory	laboratory exercises, scientific research work	1
66.	XSensors - pressure mapping system	Laboratory	laboratory exercises, scientific research work	1
67.	NextEngine - 3D Scanner	Laboratory	laboratory exercises, scientific research work	1
68.	Styrocut thermo cutter	Laboratory	laboratory exercises, scientific research work	1
69.	Control block, Mitutoyo, type: 515 - 500 , No. 009400	Laboratory	laboratory exercises, scientific research work	1
70.	Control block, Mitutoyo, type: 515 - 742, No. 022036	Laboratory	laboratory exercises, scientific research work	1
71.	Control ring Ø 10 mm, Mitutoyo, Tip: 177 - 126, No. 881078	Laboratory	laboratory exercises, scientific research work	1
72.	Control ring Ø 14 mm, Einst, Kp-01	Laboratory	laboratory exercises, scientific research work	1
73.	Control stick L= 25 mm, Mitutoyo, No. 167 - 101	Laboratory	laboratory exercises, scientific research work	1
74.	Control stick L= 50 mm, Mitutoyo, No.167 - 102	Laboratory	laboratory exercises, scientific research work	1
75.	Control stick L= 75 mm, Mitutoyo, No. 167 - 103	Laboratory	laboratory exercises, scientific research work	1
76.	Control stick L = 100 mm, Mitutoyo, No. 167 - 104	Laboratory	laboratory exercises, scientific research work	1
	Control stick L =125 mm, Mitutoyo, No.167 - 105	Laboratory	laboratory exercises,	1

77.			scientific research work	
78.	Control stick L = 150 mm, Mitutoyo, No. 167 - 106	Laboratory	laboratory exercises, scientific research work	1
79.	Control ring Ø 50 mm, Einst, Kp-02	Laboratory	laboratory exercises, scientific research work	1
80.	Control glass for flatness testing 12 mm, Mitutoyo, No. 157 – 101	Laboratory	laboratory exercises, scientific research work	1
81.	Set of plane-parallel control glasses for inspection of parallelism (4 pieces) Mitutoyo, No. 157 - 903	Laboratory	laboratory exercises, scientific research work	1
82.	Set of plane-parallel bordering scales (10 pieces), Mitutoyo, Code No: 516 - 107, Serial No. 219652	Laboratory	laboratory exercises, scientific research work	1
83.	Universal length measuring machine, Carl Zeiss Jena, No. 2492	Laboratory	laboratory exercises, scientific research work	1
84.	Universal length measuring machine, Carl Zeiss Jena, No. 1591	Laboratory	laboratory exercises, scientific research work	1
85.	Universal length measuring machine, SIP, Type: MUL-300, No. 556	Laboratory	laboratory exercises, scientific research work	1
86.	Universal measuring microscope, Carl Zeiss Jena, No. 10344	Laboratory	laboratory exercises, scientific research work	1
87.	Universal measuring microscope, UIM-21, No. 610978	Laboratory	laboratory exercises, scientific research work	1
88.	Granite measuring plate, Hommel - dura, No. 11043	Laboratory	laboratory exercises, scientific research work	1

Table 11.2 List of IT - technical resources (by type, number and purpose) for performing the activity that corresponds to the norms and standards for performing higher education activity

Order No.	Information - technical resources	Kind	Purpose	Number
1.	DELL Inspiron 5567 i5	ICT	Educational, scientific – research work	12
2.	Solid works SW EDU	ICT	Educational, scientific – research work	150

3.	Video beam	ICT	Educational, scientific – research work	2	12 .
4.	Data storage HAC	ICT	Educational, scientific – research work	1	
5.	Dell inspiron 5767 7500 u	ICT	Educational, scientific – research work	1	
6.	prinetr	ICT	Educational, scientific – research work	1	
7.	SW LCA	ICT	Educational, scientific – research work	1	
8	Personal computers WS FSC celsius W57	ICT	Educational, scientific – research work	29	
9	Personal computers WS FSC celsius W57	ICT	Educational, scientific – research work	30	
10	PC FSC FUJITSU ESPRIMO Q957	ICT	Educational, scientific – research work	50	
11	Video beam	ICT	Educational, scientific – research work	13	
12	USG Gateway PRO/USG Unifi Security PRO	ICT	Educational, scientific – research work	1	
13	PC FSC FUJITSU ESPRIMO Q597 s26361-k012- v400	ICT	Educational, scientific – research work	1	
14	PC FSC FUJITSU ESPRIMO Q957	ICT	Educational, scientific – research work	3	
15	Video beam	ICT	Educational, scientific – research work	1	
16	USG Gateway PRO/USG Unifi Security PRO	ICT	Educational, scientific – research work	1	
17	PC FSC FUJITSU ESPRIMO Q597 s26361-k012-v400	ICT	Educational, scientific – research work	1	
18	MONITOR AOC LED 21.5 I2281FWH	ICT	Educational, scientific – research work	1	
19	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 и други;	ICT	Educational, scientific – research work	1	

Information on the number of students (enrolled for the first time) of the study program in the period since the last accreditation

Table 12.1. Overview of the number of students enrolled (for the first time) in the study program in the period of the last accreditation and the number of students for whom accreditation was obtained

Academic year		Number of students for whom accreditation was obtained	Number of students enrolled in the first year
1.	2024/25	30	0
2.	2023/24	30	0

3.	2022/23	30	1
4.	2021/22	30	1
5.	2020/21	30	1
Total Enrolled Students			3

Table 12.2. Number of students for whom accreditation has been obtained or enrolled students in study programs, within the unit of the university where it belongs.

Ord. number	Title of study program	Number of students for whom accreditation was obtained	Number of students enrolled in the first year
First cycle of studies			
1	Production engineering	30	9
2	Automation and control systems	30	4
3	Thermal power engineering	30	7
4	Hydraulic power engineering	30	2
5	Industrial engineering and management	30	32
6	Energy and environment	30	8
7	Motor vehicles, transport and mechanization	30	26
8	Mechatronics	30	37
9	Industrial design	30	33
10	Materials, processes and innovations	30	4
Second cycle of studies			
1	Automation and fluid engineering	20	3
2	Motor vehicles	20	2
3	Thermal power engineering	20	1
4	Energy and environment	20	1
5	Mechatronics	20	1
6	Materials, Welding and Structural Engineering	20	1
7	Industrial engineering and management	20	4
8	Lean management	20	2
9	Management of occupational health and safety systems	20	1
10	Industrial design	20	0
11	Transport, mechanization and logistics	20	0
12	Advanced production systems and technologies	20	0
13	Product lifecycle management	20	0
14	Mechanics and machine systems	20	0
15	Sustainable energy and environment	20	0
16	Management and quality control	10	0
Third cycle of studies			
1	Mechanical engineering		2
2	Industrial engineering and management		0
In total		610	180

Table 12.3 . Number of students required by (re)accreditation according to the net area available to the unit for the realization of study programs

A	B	C	G
Total area available to the unit in m² (Table 10)	Total number of students for whom accreditation was obtained or students enrolled in all accredited study programs (Table 12.2)	Number of students requested for (re)accreditation of a new study program	Net area in m² per student (B+C)/A=
9918	610 / 180	20	16,25 m ²

12.1 Students with special needs in accordance with Article 3 6 of the Rulebook on Norms and Standards for the Establishment of Higher Education Institutions and Performing Higher Education Activities (Official Gazette of the Republic of North Macedonia No. 245/22)

Table 12.4 . Conditions that the higher education institution should provide for students with special needs.

	Conditions	Description (if it does not exist, it is left blank or planning is offered)
1.	Unhindered access to the facility	yes
2	Elevator	2
3	Special places in the classroom	yes
4	Electronic aids	1

13 . Information on scientific research and publishing activity in accordance with Article 18 of the Rulebook on Norms and Standards for the Establishment of Higher Education Institutions and Performing Higher Education Activity (Official Gazette of the Republic of North Macedonia No. 245/22)

Scientific and research activities supported by the Ss Cyril and Methodius University in Skopje

Link: https://www.ukim.edu.mk/mk_content.php?meni=146&glavno=41

Support for publishing electronic books

Links:

https://www.ukim.edu.mk/dokumenti_m/Konkurs_za_e_izdastvo-2023-2024.pdf

Internal financial mechanism supported by the Faculty of Mechanical Engineering - Skopje

<https://www.mf.ukim.edu.mk/mk/%D0%B0%D0%BA%D1%82%D0%B8>

14 . Library and information on compulsory and additional literature provided Article 37 of the Rulebook on Norms and Standards for the Establishment of Higher Education Institutions and Performing Higher Education Activities (Official Gazette of the Republic of North Macedonia No. 245/22)

Table 14.1. List of mandatory literature and the number of samples

Ord. No.	Type of literature noted in Appendix 3			Number of samples	Electronic format (Pdf, word , etc.) ⁴
	Required literature				
	Author(s)	Title	Publisher, year		
1.	Mendenhal W., Sincich T.	Statistics for Engineering and the Sciences	Maxwel Macmillan Int. Ed., New York, 1992		
2.	R. Fletcher	Practical Methods of Optimization	John Wiley & Sons, 2000		
3.	Kitto J.B., Stultz S.C., editors	Steam, its generation and use, 41 st Edition	Babcock & Wilcox, a McDermott comp., 2005		
4.	Baukal C. E. et al.	CFD in Industrial Combustion	CRC Press, 2001		
5.	C. Pozrikidis	Numerical Computation in Science and Engineering	Oxford University Press, 1998		
6.	Aubrecht G. J.	Energy: Physical, Environmental and Social Impact	Pearson, 2006		
7.		Renewable Energy	OECD/IEA, 2004		
8.	Bjørn Sortland	Course materials 2014, NTNU, Norway	NTNU, 2014		
9.	L. Drbal et al.	Power Plant Engineering	Black&Veatch, Chapman&Haal, New York, 1996		
10.	Klas Jonhagen	Modern Thermal Power Plant-Aspects on Modelling and Evaluation	Lund University, 2011		
11.	K. Annamalai, I. K. Puri, M. A. Jog,	Advanced Thermodynamics Engineering	CRC Press, 2nd edition, 2011		
12.	I. D. Holclajtner Antunovic	General course of physical chemistry	ZUNS, University in Belgrade, 2000		
13.	Baukal C.E. et al.	CFD in Industrial Combustion	CRC Press, 2001		
14.	Mile Dimitrovski, Dame Dimitrovski	ECOGAS software	Internal issue, 2010		
15.	Jeremy Colls	Air pollution	SBN 0203-4762-6, 2007		

⁴ In the column, write / mark the total number of mandatory and additional literature for which the unit has an electronic version, through access to an electronic library

16.	Rubin H., Atkinson J.	Environmental Fluid Mechanics	Marcel Dekker Inc., 2001		
17.	Hirsch C.	Numerical Computation of Internal and External Flows: The Fundamentals of Computational Fluid Dynamics	Butterworth-Heinemann, 2007		
18.	Randy D. Down, Jay H. Lehr	Environmental Instrumentation and Analysis Handbook	Wiley Interscience, Hoboken, NJ, 2005		
19.	Doebelin E. O.:	Measurement Systems - Application and Design	McGraw-Hill, NY, 2005		
20.	F. R. Bourden, D. Donnert, T. Godish, I. McKelvie	Environmental Monitoring Handbook	McGraw Hill, 2004		
21.	Charles H. Eccleston	Environmental Impact Assessment: A Guide to Best Professional Practices	CRC Press, 2011		
22.	John Glasson, Riki Therivel, Andrew Chadwick	Introduction To Environmental Impact Assessment (Natural and Built Environment Series)	Routledge, 2012		
23.	Walter Klopffer, Birgit Grahl	Life Cycle Assessment (LCA)	Wiley-VCH, 2014		
24.	Sperber B.	Environmental Sound Technologies for Sustainable Development	Springer-Verlag, 2008		
25.	Luken R., Rompaey F.	Environment and Industry in Developing Countries: Assessing the Adoption of Environmentally Sound Technology	Unido Press, 2007		
26.	Hermiosilla J., Gonzales P.	Eco-innovation: Sustainability and Competitiveness	MacMillan Publ., 2009		
27.	Multiple authors edited by Arzu Şencan Şahin	Modeling and Optimization of Renewable Energy Systems	Intech, 2012		
28.	Walter Short, Daniel J. Packey, and Thomas Holt	A Manual for the Economic Evaluation of Energy Efficiency and Renewable Energy Technologies	National Renewable Energy Laboratory, 1995		
29.	Jefferson W. Tester, Elisabeth M. Drake, Michael J. Driscoll, Michael W. Golay	Sustainable energy: choosing among options	Ars Lamina, 2012		
30.	Lee C.C.	Handbook of Environmental	Mc-Graw Hill, 2007		

		Engineering Calculations			
31.	Kemer F.N.	The Nalco Water Handbook	Mc-Graw Hill, 1979		
32.	D. Tashevski	Energy efficiency	Selected lectures and handouts, 2014		
33.	D.R. Wulfinghoff	Energy efficiency	Energy institute press, 1999		
34.	P. Bertoldi	Energy efficiency	Springer, 2007		
35.	Mile Dimitrovski	ECO Engines	Internal issue, 2008		
36.	Handbook of Air Pollution from Internal Combustion Engines: Pollutant Formation and Control	Eran Sher	Academic Press, 1998		
37.	Transport and the environment	R. E. Hester, R. M. Harrison	RS.C advanced chemical science, 2006		
38.	Speight J.G.	Natural Gas – A Basic Handbook	Gulf Publishing Company, Houston, 2007		
39.	Oneil A. Williams	Pneumatic and Hydraulic Conveying of Solids	CRC Press, 1983		
40.	G.I.Krivcenko	Hydraulic machines-turbines and pumps	Lewis publisher, 1994		
41.	European commission	Waste management options	EC, 2001		
42.	Nicholas P. Chermisinoff	Handbook of solid waste management and waste minimization technologies	Butterworth Heinemann, 2003		
43.	S. Bell, S. Morse	Sustainability Indicators: Measuring the immeasurable	EarthScan Publications. Ltd., 2000		
44.	T.E. Graedel, B. R. Allenby	Industrial Ecology	Pearson Education Inc., 2003		
45.	AWWA	Water treatment plant design	McGraw-Hill, 1990		
46.	G. Tchobanoblous	Wastewater Engineering Treatment and Reuse	McGraw-Hill, 2003		
47.	M.L. Davis	Water and Wastewater Engineering	McGraw Hill, 2010		
48.	Edited by J.B. Kitto and S.C. Stultz	Steam, It's generation and use, Ed. 41	The Babcock & Wilcox Compaany, 2005		
49.	Baukal C.E. et al.	CFD in Industrial Combustion	CRC Press, 2001		
50.	Group of authors	IPPC, Ref. Document on BAT for Large Combustion Plants	European Commission, Seville, 2006		

51.	Ivan O. Bozhic	Renewable energy sources, small hydropower plants	University in Belgrade, Faculty of Mechanical Engineering, 2022		
52.	Ingo Ball, Lea Berg, Marc J. Buiting, Dominique Courret, Laurent David, Vincent Denis, Manon Dewitte et al.	Small hydropower technologies - European state-of-the-art innovations	WIP Renewable Energies, Munich, Germany, 2020		
53.	Šarevski V.	Heating, ventilation and air conditioning	Faculty of Mechanical Engineering, 2021		
54.	Čerepnalkovski I.	Refrigeration technology	Prosvetno delo, 1995		
55.	Milan N. Sarevski Vasko N. Šarevski	Water (R718) Turbo Compressor and Ejector Refrigeration / Heat Pump Technology	Butterworth-Heinemann, 2016		
56.	IRENA	A just and inclusive energy transition in emerging markets and developing economies: Energy planning, financing, sustainable fuels and social dimensions	International Renewable Energy Agency, Abu Dhabi, 2024		
57.	Dante Dalabajan and Ruth Mayne et al.	TOWARDS A JUST ENERGY TRANSITION: Implications for communities in lower- and middleincome countries	Oxfam GB, Oxfam House, John Smith Drive, Cowley, Oxford, OX4 2JY, UK, 2022		
58.	UNDP	Just Energy Transition: Governance needs and implications. Testing the application of a conceptual framework	UNDP, 2023		
Additional literature					
	Author(s)	Title	Publisher, year		
1.	Connolly T., Begg C.	Database systems	Ars Lamina, 2010		
2.	Hari V., Rogina M., Singer S.	Numerical analysis	University of Zagreb, 2003		
3.	Doty S., Turner W. C.	Energy Management Handbook, 7th Edition	Fairmont press Inc., CRC Press, 2009		
4.	Shepherd W., Shepherd D. W.,	Energy Studies, Second Edition	Imperial College press, London, 2005		

5.	Patankar S. V.	Numerical Heat Transfer and Fluid Flow	Hemisphere Publ. Corp., 1980		
6.	Pilic-Rabadan L.	Vodne turbine, pumpe i vjetroturbine	Sveuciliste u Splitu, 2000		
7.	B.W.Wilkinson, R.W.Barnes	Cogeneration of Electricity and Useful Heat	CRC Press, Inc, Boca Raton, Florida, 1980		
8.	Baukal C.E. et al.	Heat Transfer in Industrial Combustion	CRC Press, 2000		
9.	Filkoski R.	Modelling of energy conversion processes	Faculty of Mechanical Eng., Skopje, 2011		
10.	Petrovski K.	Termodinamics, 3rd edition	1999		
11.	Handbook of Air Pollution from Internal Combustion Engines: Pollutant Formation and Control	Eran Sher	Academic Press, 1998		
12.	Transport and the environment	R. E. Hester, R. M. Harrison	RS.C advanced chemical science, 2006		
13.	White F. M.	Fluid Mechanics	Mc-Graw Hill, 2008		
14.	G. Bruce Wiersma	Environmental Monitoring	CRC Press, 2004		
15.	Janick Artiola, Ian Pepper, Mark Brusseau	Environmental Monitoring and Characterization	Elsevier Academic Press, 2004		
16.	Glasson J., Therivel R. and Chadwick A.	Introduction to Environmental Impact Assessment. Principles and procedures, process, practice and prospects.	The Natural and Built Environment Series. T.J. International Ltd, Padstow, UK, 1999		
17.	Odum, H.T.	Environmental Accounting - Emergy and environmental decision making	John Wiley & Sons, Inc., New York, 1996		
18.	David R. Godschalk	Sustainable Development Projects: Integrating Design, Development, and Regulation	APA Planners Press; 1 edition (April 7, 2014)		
19.	WEF Manual of Practice No. FD-3	Industrial waste water managment, treatment and disposal	WEF Press, 2008		
20.	D.R. Wulfinghoff	Energy Efficiency Manual	Energy institute press, 2000		
21.	The biodiesel handbook	Van Gerpen, Knothe and others	AOCS Press, Illinois, 2005		
22.	Wang X., Economides M.	Advanced Natural Gas Engineering	Gulf Publishing Company, Houston, Texas, 2009		

23.	David Mills,	Pneumatic Conveying Design Guide	ELSEVIER, 2004		
24.	Frank Yeaple	Fluid Power Design Handbook	CRC Press, 1995		
25.	George Tchobanoglous, Frank Kraith	Handbook of solid waste management	McGraw Hill, 2002		
26.	UN CSD	Sustainable Development Knowledge platform	UN		
27.	Organisation of Economic Cooperation and Development (OECD)	"Core Set of Indicators for Environmental Performance Reviews". A synthesis report by the Group on the State of the Environment.	Paris: 39, 1993		
28.	Golay, M., Field, R., Green, Jr. W., Wright, J.C.	Introduction to Sustainable Energy (Online open course-materials)	MIT, 2010		
29.	D. A. Vallero, P. A. Vesilind	Socially Responsible Engineering: Justice in Risk Management	John Wiley & Sons Inc., 2007		
30.	S.A.Boyer	SCADA: Supervisory Control and Data Acquisition	ISA - The Instrumentation, Systems, and Automation Society, 1999		
31.	W. Bolton	Programmable Logic Controllers	Elsevier, 2009		
32.	Warner, Davis and Wark	Air Pollution: Its Origin and Control, 3 rd Edition	Addison-Wesley-Longman, 2003		
33.	Petrovski I. J.	Steam Boilers, 2nd ed.	UKIM, 2009		
34.	Baukal C.E. et al.	Heat Transfer in Industrial Combustion	CRC Press, 2000		
35.	Armando Carravetta , Shahram Derakhshan Houreh , Helena M. Ramos	Pumps as Turbines: Fundamentals and Applications	Springer, 2018		
36.	ASHRAE	ASHRAE HANDBOOK - Heating, Ventilating, and Air-Conditioning APPLICATIONS	ASHRAE, 2015		
37.	Giuseppe Grazzini, Adriano Milazzo, Federico Mazzelli	Ejectors for efficient refrigeration	Springer, 2017		
38.	Löhr, K.; Matavel, C.E.;Tadesse, S.; Yazdanpanah, M.; Sieber, S.; Komendantova, N.	Just Energy Transition: Learning from the Past for a More Just and Sustainable Hydrogen	Land 2022, 11, 2193, 2022		

		Transition in West Africa			
39.	Miquel Muñoz Cabré, José Vega-Araújo	Considerations for a just and equitable energy transition	Stockholm+50 background paper series. Stockholm Environment Institute, 2022		
40.	Chuan Liao, Arun Agrawal	Sustainable and just energy transition in the Global South	World Development, Volume 152, 105798, 2022		
41.	Anna Creti, Zied Ffiti	Energy, just transition, and sustainability: What's new?	Energy Economics, Volume 139, 2024, 107872, 2024		

15. Website Information (Article 21 of the Law on Higher Education (Official Gazette of the Republic of North Macedonia No. 82/18) and Article 18 of the Rulebook on Standards and Norms for the Establishment of Higher Education Institutions and Performing Higher Education Activities (Official Gazette of the Republic of North Macedonia No. 245/22))

15.1. Public in the work of the higher education institution

Table 15. Available and published information about the work of the higher education institution and the study program that is subject to re/accreditation

Ord. No.	Type of information published	Link
1.	The statute of the unit (with all amendments and additions) and other acts regulating internal relations	https://www.mf.ukim.edu.mk/sites/default/files/Statut%20na%20MFS%20-%20Univerzitetski%20glasnik%20465.pdf
2.	Study programs	https://www.mf.ukim.edu.mk/mk/poslediplomski-studii-full-time-studii
3.	The report of the last self-evaluation	https://www.mf.ukim.edu.mk/mk/%D0%B0%D0%BA%D1%82%D0%B8
4.	The solution for the accreditation of each study program separately and the solution for starting work for each study program separately	https://www.mf.ukim.edu.mk/mk/node/1585
5.	The act of systematization	https://www.mf.ukim.edu.mk/mk/%D0%B0%D0%BA%D1%82%D0%B8
6.	The rules for the work of the teaching-scientific, that is, the scientific council	https://www.mf.ukim.edu.mk/mk/%D0%B0%D0%BA%D1%82%D0%B8
7.	Report and decision on final selection in title for each teacher and associate published in the Bulletin	https://www.mf.ukim.edu.mk/mk/redovni-profesori https://www.mf.ukim.edu.mk/mk/vonredni-profesori https://www.mf.ukim.edu.mk/mk/docenti https://www.mf.ukim.edu.mk/mk/asistenti

8.	The schedule of work tasks	https://www.mf.ukim.edu.mk/
9.	Accepted topics for master's /doctoral theses	https://www.mf.ukim.edu.mk/mk/node/1381
10.	Acts carried by the unit according to other laws	https://www.mf.ukim.edu.mk/mk/%D0%B0%D0%BA%D1%82%D0%B8
11.	The code of ethics	https://www.ukim.edu.mk/dokumenti_m/248_Eticki_kodeks.pdf

16 . Activities and mechanisms through which the quality of teaching is developed and maintained

Internal mechanisms for ensuring and controlling the quality of studies:

- development of teaching contents,
- implementation of the teaching process
- assessment of students,
- preparation of a graduation thesis,
- assessment of the quality of teaching by students with surveys at the end of each semester for each subject,
- evaluation of the quality of the study program by the students during the awarding of the diploma,
- other procedures related to the resources and logistics of the teaching process,
- conducting an internal evaluation (self-evaluation).

Self-evaluation is carried out as a process of self-evaluation at the level of study programs, as well as self-evaluation at the level of the entire Faculty.

The self-evaluation is carried out by a commission formed by the Teaching and Research Council, consisting of seven members, five of whom are teachers and two members are students.

Segments of the self-evaluation expressed through SWOT analysis: SWOT analysis of the first cycle studies, SWOT analysis of the second cycle studies, SWOT analysis of the third cycle studies, SWOT analysis of the teaching and associate staff, SWOT analysis for spatial and material resources, SWOT analysis for the logistics of the Faculty of Engineering - Skopje, SWOT analysis for the international cooperation of the Faculty of Engineering - Skopje, SWOT analysis for the scientific research activity, SWOT analysis for funding.

Self-evaluation report, for the period 2017-2020, link:

<https://www.mf.ukim.edu.mk/sites/default/files/%212023%20%D0%9C%D0%A4%D0%A1%20%D0%98%D0%B7%D0%B2%D0%B5%D1%88%D1%82%D0%B0%D1%98%20%D1%81%D0%B0%D0%BC%D0%BE%D0%B5%D0%B2%D0%B0%D0%BB%D1%83%D0%B0%D1%86%D0%B8%D1%98%D0%B0.pdf>

The quality of the studies is controlled in accordance with the valid legal and by-laws as well as with the acts of the University and the Faculty.

17. Results of the performed self-evaluation according to the Guidelines for the unique bases of the evaluation and evaluation procedures of the universities adopted by the agency for the evaluation of higher education in the Republic of Macedonia and by the Interuniversity Conference of the Republic of Macedonia (Skopje-Bitola, September 2002).

Link: <https://www.mf.ukim.edu.mk/mk/%D0%B0%D0%BA%D1%82%D0%B8>

18. The adequacy of the structure and content of the cycle of studies with the general and specific descriptors

General descriptors		Subjects through which achievement of the general descriptors is ensured
<i>A general descriptor</i>	<i>Description</i>	

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 scientific research and new sources of knowledge.	1. Selected topics in Mathematics and Informatics 2. Advanced Course in Energy Transformation 3. Advanced Thermodynamics – selected chapters 4. Fluid Mechanics in Environmental Engineering
Application of 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.	All courses in the study programme
Assessment ability	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.	1. Modeling and simulation of Energy Systems 2. Waste management 3. Transport and the environment 4. Environmental measurement methods and monitoring systems
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.	1. Experts in Teamwork
Study skills	Takes initiative to identify the needs for acquiring further knowledge and learning with a high degree of autonomy.	All courses in the study programme

Specific descriptors		Subjects through which the achievement of the specific descriptors is ensured
A specific descriptor	Description	

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 energy sources, ways of transformation and its efficient use • Operation and maintenance of power plants • Regulations and testing of machines and power plants • Technical control, supervision and inspection during the construction of power plants and systems • Development of expert reports on energy machinery and equipment • Knowledge of techniques, rules and measures to protect the environment	1. Thermal power plants – advanced level 1 2. Energy economics 3. Energy efficiency 4. Clean energy technologies 5. Eco-engines 6. Water and waste water treatment 7. Hidden hydropower technologies 8. HVAC, refrigeration and heat pump technology
Application of 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.	1. Environmental system analysis 2. Design of fluid conveying and hydro power system 3. Automation of environmental processes
Assessment ability	Possesses the ability to collect, analyze, 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 Sustainable Energy and Environment, to provide well-supported explanations of the causes of certain phenomena, to explain the laws behind them, and to choose an appropriate solution.	1. Sustainable, green and just energy transition: concepts and aspects 2. Energy vs. Sustainable development: concepts and aspects 3. Eco-innovations
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 of participating independently, taking a professional approach, in specific, scientific, and interdisciplinary discussions.	All courses in the study programme
Study 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.	All courses in the study programme

19. Compliance of theoretical and practical teaching with the objectives of the study program

Table 19. List of institutions with which the higher education institution has concluded an agreement for practical teaching in the study area of the study program for which accreditation is requested

Ord. number	Name of institution	Way of performing practical teaching	Estimated time for realization of practical teaching
1.	IGM Trade	Work of the student in the institution / company on specific problem under supervision of an employee	According to the needs of research in the master's thesis
2.	OKTA		
3.	TE -TO AD Skopje		
4.	Eco Vent DOOEL		
5.	Ad ESM		
6.	Public Enterprise Water Supply-Kumanovo		
7.	Hydrometeorological service of North Macedonia		

20 . Compliance of the study program with the single European area for higher education and comparability with the programs of European higher education institutions

compliance of the study program with the single European area for higher education and comparability with the programs of European higher education institutions **is confirmed.**

	Name of institution	Name of study program with which comparability is ensured	Link to the study program
1.	Utrecht University, The Netherlands	Energy Science	https://www.uu.nl/en/masters/energy-science/study-programme
2.	University of Padova, Italy	Energy Engineering	https://www.unipd.it/en/educational-offer/second-cycle-degree/engineering?ordinamento=2021&key=IN2595&tipo=LM&sc
3.	Tsinghua University, China	Energy and Power Engineering	https://www.depe.tsinghua.edu.cn/jxgz/jxcg.htm

21. Rules governing the writing of written exams, assignments, essays, term papers, projects, graduate work, master's thesis and other activities that are performed in writing, which include at least content, scope, writing style and other relevant requirements.

LINK: <https://www.mf.ukim.edu.mk/sites/default/files/Glasnik-637%20-20Pravila%20za%20studiranje.pdf>

22. Information on provided quality financial guarantee for the study program⁵

Table 21. The value of the financial guarantee

Value of the attached bank guarantee	Tuition amount that the student pays when enrolling in the study program	Total number of students enrolled at a higher education institution (university or vocational school)	Number of students for whom accreditation is sought
N/A			

⁵ They fill private higher education institutions and higher vocational schools

23. Data on teachers who can be mentors of a master's thesis of the second cycle of academic/professional studies of the study program **SUSTAINABLE ENERGY AND ENVIRONMENT**

Table 22. A review of teachers who can be mentors of a master's thesis in the second cycle of studies

Ord. No.	Name and surname of the teacher	Teaching-scientific, teaching or scientific title in which the teacher is selected	Scientific field in which he was selected	A scientific field in which the teacher can be a master's thesis mentor related to the scientific field of the study program
1.	Done Tashevski	Full Professor	20501 Theory and construction of power machines (Steam generators; Thermal turbines) 20502 Theory and design of power plants	Areas of the scientific field Energy (205), referred to in point 3 in accordance with the subjects in the study program 20501 Theory and construction of power machines (Steam generators; Thermal turbines) 20502 Theory and design of power plants
2.	Risto Filkoski	Full Professor	20500 Energy and process engineering (Heat exchange; Multiphase systems) 20511 Technical Thermodynamics	Areas of the scientific field Energy (205), referred to in point 3 in accordance with the subjects in the study program 20500 Energy and process engineering (Heat exchange; Multiphase systems)

				20511 Technical Thermodynamics
3.	Zoran Markov	Full Professor	21420 Fluid mechanics and fluid flow systems 21421 Hydropower Engineering	21420 Fluid mechanics and fluid flow systems 21421 Hydropower Engineering
4.	Ana Lazarevska	Full Professor	22500 Environment 20503 Mathematical modeling and simulation of energy processes	22500 Environment 20503 Mathematical modeling and simulation of energy processes
5	Atanasko Tuneski	Full Professor	21422 Automation	21422 Automation
6	Dame Dimitrovski	Full Professor	20507 Internal combustion engines 20508 Propulsion Materials (Fuels and Energy Conversion Technologies)	Areas of the scientific field Energy (205), referred to in point 3 in accordance with the subjects in the study program 20507 Internal combustion engines 20508 Propulsion Materials (Fuels and Energy Conversion Technologies)
7	Darko Babunski	Full Professor	21422 Automation 22500 Environment	21422 Automation 22500 Environment
8	Emil Zaev	Full Professor	21422 Automation 22500 Environment	21422 Automation 22500 Environment

9	Igor Shesho	Associate professor	20505 Unconventional energy sources and technologies	Areas of the scientific field Energy (205), referred to in point 3 in accordance with the subjects in the study program 20505 Unconventional energy sources and technologies
10	Viktor Iliev	Associate professor	21420 Fluid mechanics and fluid flow systems	21420 Fluid mechanics and fluid flow systems
11	Marija Lazarevikj	Assistant professor	21420 Fluid mechanics and fluid flow systems	21420 Fluid mechanics and fluid flow systems
12	Aleksandar Gjerassimovski	Assistant professor	20504 Thermotechnics and Thermotechnical Devices and Plants	20504 Thermotechnics and Thermotechnical Devices and Plants

DOCUMENT

1. Proposal Decision for the adoption of the study program by the Teaching and Scientific Council of the faculty, the teaching council of the higher professional school or the scientific council of the scientific institute Article 110 and Article 145 of the Law on Higher Education (" Official Gazette of the Republic of Macedonia " No. 82/2018)

Машински факултет
Број 02-1826/1
26.12.2024 год.
Скопје

Врз основа на член 110 од Законот за високото образование (Службен весник на РСМ бр.82/18), член 69 од Статутот на Машинскиот факултет во Скопје во состав на Универзитетот „Св. Кирил и Методиј“ во Скопје (Универзитетски гласник број 465/2019 и 635/2022), како и врз основа на поднесениот предлог Елаборат за акредитација на Студиска програма од втор циклус на академски студии по Sustainable energy and environment, Наставно- научниот совет на Факултетот на седницата одржана на 26.12.2024 година, ја донесе следната:

ПРЕДЛОГ ОДЛУКА
за усвојување на студиска програма за втор циклус на академски студии по
Sustainable energy and environment

Член 1

Се усвојува Елаборатот на Студиската програма **Sustainable energy and environment** на втор циклус на академски студии во рамките на Машински Факултет во Скопје.

Член 2

Наставата, од Студиската програма **Sustainable energy and environment** ќе започне да се изведува по добивањето согласност од Одборот за акредитација на високообразовните установи и по добивањето на согласност за исполнетост на условите за почеток со работа на студиската програма од страна на Агенцијата за квалитет на високото образование на Република Северна Македонија.

Член 3

Предлог Одлуката да се достави до Ректорска управа и Универзитетскиот Сенат за усвојување на Студиската програма по **Sustainable energy and environment**.

Член 4

Составен дел на оваа одлука е Елаборатот на Студиската програма **Sustainable energy and environment**.

Член 5

Оваа Одлука влегува во сила со денот на нејзиното донесување.

Универзитетот „Св. Кирил и Методиј“ во Скопје,
Машински факултет - Скопје
Декан
Проф. д-р Златко Петрески
М.П.



Доставено до:

- Архивата на Машински факултет;
- Универзитетскиот сенат на Универзитет „Св. Кирил и Методиј“ во Скопје
- Наставно-научен совет
- Елаборат

2. Decision on the adoption of the study program by the University Senate, i.e. the Council of the Scientific Institution; Article 94 and Article 145 of the Law on Higher Education (Official Gazette of the Republic of Macedonia No. 82/2018)



Универзитет „Св. Кирил и Методиј“ Скопје
Ss. Cyril and Methodius University in Skopje

Одлука од УС
Ознака: ОВ 5.5/13
Страна: 1 од 1

Бр. 02-391/3
28.2.2025 година
Скопје

Република Северна Македонија
УНИВЕРЗИТЕТ „СВ. КИРИЛ И МЕТОДИЈ“ СКОПЈЕ
МАШИНСКИ ФАКУЛТЕТ
С К О П Ј Е

Примено:	06-03-2025		
Орг.Един.	Број:	Прилог:	Вредност:
08	99/	2	

Врз основа на член 94, став 1, точка 3 од Законот за високото образование (Службен весник на Република Македонија бр. 82/2018 и Службен весник на Република Северна Македонија бр. 178/2021 и 58/2024) и член 157, став 1, точка 8 од Статутот на Универзитетот „Св. Кирил и Методиј“ во Скопје (Универзитетски гласник бр. 425/2019), по предлог на Наставно-научниот совет на **Машинскиот факултет**, Универзитетскиот сенат на Универзитетот „Св. Кирил и Методиј“ во Скопје, на 18. седница одржана на 28.2.2025 година, донесе

ОДЛУКА

за усвојување на Елаборатот за студиската програма од втор циклус, едногодишни студии Sustainable Energy and Environment, на англиски јазик, на Машинскиот факултет

Член 1

Се усвојува Елаборатот за студиската програма од втор циклус, едногодишни студии Sustainable Energy and Environment, на англиски јазик, на Машинскиот факултет во Скопје.

Член 2

Наставата од студиската програма од втор циклус, едногодишни студии - Sustainable Energy and Environment, на англиски јазик, ќе започне да се изведува по добивањето согласност од Одборот за акредитација на високото образование и по добивањето согласност за исполнување на условите за почеток со работа на студиската програма од страна на Агенцијата за квалитет на високото образование на Република Северна Македонија.

Член 3

Одлуката се доставува до предлагачот и до Одборот за акредитација на високото образование на натамошна постапка за акредитација на студиската програма.

Член 4

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

Претседател на Универзитетскиот сенат
Проф. д-р Драга Димитриевски



3. Opinion of the Board for cooperation and trust with the public

Машински факултет
Број 02-49/4
15.01.2025
Скопје

Врз основа на член 122 од Законот за високото образование (Сл. Весник бр. 82/2018 и 178/2021) и член 93 од Статутот на Машински факултет во состав на Универзитетот „Св. Кирил и Методиј“ во Скопје (Универзитетски гласник бр. 465/2019 и 635/2022), Одборот за соработка и доверба со јавноста при Машинскиот факултет во Скопје, на 1-та седница одржана на 15.01.2025 година, го донесе

МИСЛЕЊЕ

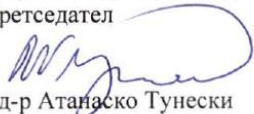
Се дава позитивно мислење за Елаборатот за Студиската програма Sustainable Energy and Environment на втор циклус на академски студии на Машинскиот факултет во Скопје во состав на Универзитетот „Св. Кирил и Методиј“ во Скопје

Образложение

Одборот за соработка и доверба со јавноста на Машинскиот факултет во Скопје го разгледа Елаборатот на Студиската програма **Sustainable Energy and Environment** и донесе заклучок дека предложената студиска програма за акредитација е во согласност со модерниот развој на науката и потребите на индустријата и се очекува да оспособи висококлучни кадри од соодветната област.

Поради сето тоа Одборот за соработка и доверба со јавноста на Машинскиот факултет во Скопје го даде своето позитивно мислење.

Одбор на Одборот за соработка со јавноста
Претседател


проф. д-р Атанаско Тунески

Доставено до:

- Архивата на Машински факултет;
- Елаборат

4. Statement from the teacher for giving consent to participate in the teaching of certain subjects from the study program

Република Северна Македонија
УНИВЕРЗИТЕТ "СВ. КИРИЛ И МЕТОДИЈ" - СКОПЈЕ
МАШИНСКИ ФАКУЛТЕТ
Бр. 08-1770/15
23-12-2024 20-год.
СКОПЈЕ

OB.2

Елаборат за акредитирање на студиска
програма од втор циклус

4. Изјава од наставникот за давање согласност за учество во изведување на настава по одредени предмети од студиската програма

Врз основа на член 61 став 1 точка 4 од Законот за високо образование (Службен весник на Република Македонија, број 82/2018) ја давам следната

ИЗЈАВА

за давање согласност за учество во изведување на настава по одредени предмети од студиската програма на втор циклус студии по

Sustainable energy and environment

Јас Емил Заев, избран во звање редовен професор и вработен на Машински факултет во Скопје на Универзитетот „Св. Кирил и Методиј“ во Скопје давам согласност за учество во изведување на настава од Студиската програма **Sustainable energy and environment** на Машинскиот факултет во Скопје, по наставните предмети:

1. Automation of environmental processes
2. Modeling and Simulations of Energy Systems

Скопје,

Подносител на изјава



Република Северна Македонија
УНИВЕРЗИТЕТ "СВ. КИРИЛ И МЕТОДИЈ" - СКОПЈЕ
МАШИНСКИ ФАКУЛТЕТ
Бр. 08-1770/16
23-12-2024 20 год.
С К О П Ј Е

4. Изјава од наставникот за давање согласност за учество во изведување на настава по одредени предмети од студиската програма

Врз основа на член 61 став 1 точка 4 од Законот за високо образование (Службен весник на Република Македонија, бр.82/2018) ја давам следната

ИЗЈАВА

*за давање согласност за учество во изведување на настава по одредени предмети од студиската програма на втор циклус на академски/стручни студии по
Sustainable energy and environment*

Јас Атанас Кочов, избран во звање редовен професор и вработен на Машински факултет - Скопје на Универзитет „Св. Кирил и Методиј“ во Скопје давам согласност за учество во изведување на настава од Студиската програма Sustainable energy and environment на Машинскиот факултет - Скопје, по наставните предмети:

1. An Introduction to Eco-innovation

Место, ден, месец, година

Скопје, 23.12.2024

Подносител на изјава

Проф. д-р Атанас Кочов

Република Северна Македонија
УНИВЕРЗИТЕТ "СВ. КИРИЛ И МЕТОДИЈ"-СКОПЈЕ
МАШИНСКИ ФАКУЛТЕТ

Бр. 08-1440/10
18-12-2024 20- год.
С К О П Ј Е

ОБ.2 Елаборат за акредитирање на студиска програма од втор циклус

4. Изјава од наставникот за давање согласност за учество во изведување на настава по одредени предмети од студиската програма

Врз основа на член 61 став 1 точка 4 од Законот за високо образование (Службен весник на Република Македонија, број 82/2018) ја давам следната

ИЗЈАВА

за давање согласност за учество во изведување на настава по одредени предмети од студиската програма на втор циклус студии по

Sustainable energy and environment

Јас Бојан Прангоски, избран во звање редовен професор и вработен на Машински факултет во Скопје на Универзитетот „Св. Кирил и Методиј“ во Скопје давам согласност за учество во изведување на настава од Студиската програма **Sustainable energy and environment** на Машинскиот факултет во Скопје, по наставните предмети:

1. Selected topics in Mathematics and Informatics

Скопје,
12.12.2024

Подносител на изјава



Република Северна Македонија
УНИВЕРЗИТЕТ "СВ. КИРИЛ И МЕТОДИЈ"-СКОПЈЕ
МАШИНСКИ ФАКУЛТЕТ
Бр. 02-1470/8
18-12-2024 год.
СКОПЈЕ

ОБ.2

Елаборат за акредитирање на студиска програма од втор циклус

4. Изјава од наставникот за давање согласност за учество во изведување на настава по одредени предмети од студиската програма

Врз основа на член 61 став 1 точка 4 од Законот за високо образование (Службен весник на Република Македонија, број 82/2018) ја давам следната

ИЗЈАВА

за давање согласност за учество во изведување на настава по одредени предмети од студиската програма на втор циклус студии по

Sustainable energy and environment

Јас Никола Тунески, избран во звање редовен професор и вработен на Машински факултет во Скопје на Универзитетот „Св. Кирил и Методиј“ во Скопје давам согласност за учество во изведување на настава од Студиската програма **Sustainable energy and environment** на Машинскиот факултет во Скопје, по наставните предмети:

1. Selected Topics in Mathematics and Informatics

Скопје, 12.12.2024

Подносител на изјава

Никола Тунески

Република Северна Македонија
УНИВЕРЗИТЕТ „СВ. КИРИЛ И МЕТОДИЈ“ СКОПЈЕ
МАШИНСКИ ФАКУЛТЕТ
Бр. 08-1770/9
18-12-2024, 20- год.
СКОПЈЕ

OB.2

Елаборат за акредитирање на студиска
програма од втор циклус

4. Изјава од наставникот за давање согласност за учество во изведување на
настава по одредени предмети од студиската програма

Врз основа на член 61 став 1 точка 4 од Законот за високо образование
(Службен весник на Република Македонија, број 82/2018) ја давам
следната

ИЗЈАВА

за давање согласност за учество во изведување на настава по одредени
предмети од студиската програма на втор циклус студии по

Sustainable energy and environment

Јас, Алекса Малчески, избран во звање редовен професор и
вработен на Машински факултет во Скопје на Универзитетот „Св. Кирил
и Методиј“ во Скопје давам согласност за учество во изведување на
настава од Студиската програма **Sustainable energy and environment**
на Машинскиот факултет во Скопје, по наставните предмети:

1. Selected Topics in Mathematics and Informatics

Скопје,
12.12.2024

Подносител на изјава



Република Северна Македонија
УНИВЕРЗИТЕТ „СВ. КИРИЛ И МЕТОДИЈ“ - СКОПЈЕ
МАШИНСКИ ФАКУЛТЕТ
Бр. 08-1770/6
18-12-2024 20- год.
С К О П Ј Е

4. Изјава од наставникот за давање согласност за учество во изведување на настава по одредени предмети од студиската програма

Врз основа на член 61 став 1 точка 4 од Законот за високо образование (Службен весник на Република Македонија, бр.82/2018) ја давам следната

ИЗЈАВА

за давање согласност за учество во изведување на настава по одредени предмети од студиската програма на втор циклус на академски/стручни студии по
Sustainable energy and environment

Јас Александар Герасимовски, избран во звање доцент и вработен на Машински факултет - Скопје на Универзитет „Св. Кирил и Методиј“ во Скопје давам согласност за учество во изведување на настава од Студиската програма Sustainable energy and environment на Машинскиот факултет - Скопје, по наставните предмети:

1. HVAC, refrigeration and heat pump technology

Место, ден, месец, година

Скопје, 17.12.2024

Подносител на изјава

Доц. д-р Александар Герасимовски



Република Северна Македонија
УНИВЕРЗИТЕТ „СВ. КИРИЛ И МЕТОДИЈ“ СКОПЈЕ
МАШИНСКИ ФАКУЛТЕТ
Бр. 08-1440/5
18-12-2020 год.
СКОПЈЕ

ОБ.2 Елаборат за акредитирање на студиска програма од втор циклус

4. Изјава од наставникот за давање согласност за учество во изведување на настава по одредени предмети од студиската програма

Врз основа на член 61 став 1 точка 4 од Законот за високо образование (Службен весник на Република Македонија, број 82/2018) ја давам следната

ИЗЈАВА

за давање согласност за учество во изведување на настава по одредени предмети од студиската програма на втор циклус студии по Sustainable energy and environment

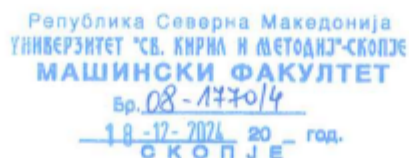
Јас Игор Шешо, избран во звање вонреден професор и вработен на Машински факултет во Скопје на Универзитетот „Св. Кирил и Методиј“ во Скопје давам согласност за учество во изведување на настава од Студиската програма **Sustainable energy and environment** на Машинскиот факултет во Скопје, по наставните предмети:

1. Energy economics
2. Advanced Course in Energy Transformation

Скопје,

Подносител на изјава





4. Изјава од наставникот за давање согласност за учество во изведување на настава по одредени предмети од студиската програма

Врз основа на член 61 став 1 точка 4 од Законот за високо образование (Службен весник на Република Македонија, бр.82/2018) ја давам следната

ИЗЈАВА

за давање согласност за учество во изведување на настава по одредени предмети од студиската програма на втор циклус на академски/стручни студии по
Sustainable energy and environment

Јас Даме Димитровски, избран во звање редовен професор и вработен на Машински факултет - Скопје на Универзитет „Св. Кирил и Методиј“ во Скопје давам согласност за учество во изведување на настава од Студиската програма Sustainable energy and environment на Машинскиот факултет - Скопје, по наставните предмети:

1. Modeling and Simulations of Energy Systems
2. Advanced Course in Energy Transformation
3. Experts in Teamwork (EiT)
4. Transport and the environment

Место, ден, месец, година

Скопје, 18.12.2024

Подносилац на изјава

Проф. д-р Даме Димитровски

Република Северна Македонија
УНИВЕРЗИТЕТ „СВ. КИРИЛ И МЕТОДИЈ“ СКОПЈЕ
МАШИНСКИ ФАКУЛТЕТ

Об.1 Бр. 08-1440/11
18-12-2024 20- год.
С К О П Ј Е

Елаборат за акредитирање на студиска програма од втор циклус

4. Изјава од наставникот за давање согласност за учество во изведување на настава по одредени предмети од студиската програма

Врз основа на член 61 став 1 точка 4 од Законот за високо образование (Службен весник на Република Македонија, број 82/2018) ја давам следната

ИЗЈАВА

за давање согласност за учество во изведување на настава по одредени предмети од студиската програма на втор циклус студии по

Sustainable energy and environment

Јас Ристо Филкоски, избран во звање професор и вработен на Машински факултет во Скопје на Универзитетот „Св. Кирил и Методиј“ во Скопје давам согласност за учество во изведување на настава од Студиската програма **Sustainable energy and environment** на Машинскиот факултет во Скопје, по наставните предмети:

1. Thermodynamics - selected chapters
2. Clean energy technologies

Скопје, 05.12.2024

Подносител на изјава



Проф. д-р Ристо Филкоски



4. Изјава од наставникот за давање согласност за учество во изведување на настава по одредени предмети од студиската програма

Врз основа на член 61 став 1 точка 4 од Законот за високо образование (Службен весник на Република Македонија, бр.82/2018) ја давам следната

ИЗЈАВА

за давање согласност за учество во изведување на настава по одредени предмети од студиската програма на втор циклус на академски/стручни студии по
Sustainable energy and environment

Јас Доне Ташевски, избран во звање редовен професор и вработен на Машински факултет - Скопје на Универзитет „Св. Кирил и Методиј“ во Скопје давам согласност за учество во изведување на настава од Студиската програма Sustainable energy and environment на Машинскиот факултет - Скопје, по наставните предмети:

1. Energy efficiency
2. Thermal power plants – advanced level I
3. Modeling and Simulations of Energy Systems
4. Advanced Course in Energy Transformation

Место, ден, месец, година

Скопје, 10.12.2024

Подносител на изјава

Проф. д-р Доне Ташевски

Република Северна Македонија
УНИВЕРЗИТЕТ "СВ. КИРИЛ И МЕТОДИЈ" - СКОПЈЕ
МАШИНСКИ ФАКУЛТЕТ
Бр. 08-1730/7
18-12-2024 20 год.
СКОПЈЕ

ОБ.2

Елаборат за акредитирање на студиска програма од втор циклус

4. Изјава од наставникот за давање согласност за учество во изведување на настава по одредени предмети од студиската програма

Врз основа на член 61 став 1 точка 4 од Законот за високо образование (Службен весник на Република Македонија, број 82/2018) ја давам следната

ИЗЈАВА
за давање согласност за учество во изведување на настава по одредени предмети од студиската програма на втор циклус студии по

Sustainable energy and environment

Јас Марија Лазаревиќ избрана во звање доцент и вработен на Машински факултет во Скопје на Универзитетот „Св. Кирил и Методиј“ во Скопје давам согласност за учество во изведување на настава од Студиската програма **Sustainable energy and environment** на Машинскиот факултет во Скопје, по наставните предмети:

1. Hidden Hydropower Technologies

Скопје, 16.12.2024

Подносител на изјава
Марија Лазаревиќ

OB.1

Елаборат за акредитирање на студиска
програма од втор циклус

4. Изјава од наставникот за давање согласност за учество во изведување на
настава по одредени предмети од студиската програма

Република Северна Македонија
УНИВЕРЗИТЕТ "СВ. КИРИЛ И МЕТОДИЈ" - СКОПЈЕ
МАШИНСКИ ФАКУЛТЕТ
бр. 08-1770/14
18.12.2024 год.
С К О П Ј Е

Врз основа на член 61 став 1 точка 4 од Законот за високо образование
(Службен весник на Република Македонија, број 82/2018) ја давам
следната

ИЗЈАВА

за давање согласност за учество во изведување на настава по одредени
предмети од студиската програма на втор циклус студии по

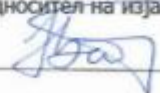
Sustainable energy and environment

Јас Дарко Бабунски, избран во звање редовен професор и
вработен на Машински факултет во Скопје на Универзитетот „Св. Кирил
и Методиј“ во Скопје давам согласност за учество во изведување на
настава од Студиската програма **Sustainable energy and environment**
на Машинскиот факултет во Скопје, по наставните предмети:

1. Modeling and Simulations of Energy Systems
2. Environmental Measurement methods and Monitoring Systems
3. Automation of environmental processes

Скопје,

Подносител на изјава



OB.2

Елаборат за акредитирање на студиска
програма од втор циклус4. Изјава од наставникот за давање согласност за учество во изведување на
настава по одредени предмети од студиската програмаРепублика Северна Македонија
УНИВЕРЗИТЕТ "СВ. КИРИЛ И МЕТОДИЈ" - СКОПЈЕ
МАШИНСКИ ФАКУЛТЕТБр. 08-1770/15
18.12. 2024 год.
6.8.88Врз основа на член 61 став 1 точка 4 од Законот за високо образование
(Службен весник на Република Македонија, број 82/2018) ја давам
следната**ИЗЈАВА**за давање согласност за учество во изведување на настава по одредени
предмети од студиската програма на втор циклус студии по*Sustainable energy and environment*

Јас Ана ЛАЗАРЕВСКА, избрана во звање редовен професор и
вработена на Машински факултет во Скопје на Универзитетот „Св. Кирил
и Методиј“ во Скопје давам согласност за учество во изведување на
настава од Студиската програма **Sustainable energy and environment**
на Машинскиот факултет во Скопје, по наставните предмети:

1. Modeling and Simulations of Energy Systems 2EE05
2. Energy vs. Sustainable Development: Concepts and Aspects 1M6SEE07
3. Sustainable, Green and Just Energy Transition

Скопје,

Подносител на изјава



OB.2

Република Северна Македонија
УНИВЕРЗИТЕТ „СВ. КИРИЛ И МЕТОДИЈ“ СКОПЈЕ
МАШИНСКИ ФАКУЛТЕТ
Бр. 08-1790/2
18-12-2024 во год.
СКОПЈЕ

Елаборат за акредитирање на студиска
програма од втор циклус

4. Изјава од наставникот за давање согласност за учество во изведување на настава по одредени предмети од студиската програма

Врз основа на член 61 став 1 точка 4 од Законот за високо образование (Службен весник на Република Македонија, број 82/2018) ја давам следната

ИЗЈАВА

за давање согласност за учество во изведување на настава по одредени предмети од студиската програма на втор циклус студии по

Sustainable energy and environment

Јас Виктор Илиев избран во звање вонреден професор и вработен на Машински факултет во Скопје на Универзитетот „Св. Кирил и Методиј“ во Скопје давам согласност за учество во изведување на настава од Студиската програма **Sustainable energy and environment** на Машинскиот факултет во Скопје, по наставните предмети:

1. Advanced Course in Energy Transformation

Скопје, 16.12.2024

Подносител на изјава



05.2

Елаборат за акредитирање на студиска
програма од втор циклус

4. Изјава од наставникот за давање согласност за учество во изведување на настава по одредени предмети од студиската програма

Република Северна Македонија
УНИВЕРЗИТЕТ "СВ. КИРИЛ И МЕТОДИЈ" - СКОПЈЕ
МАШИНСКИ ФАКУЛТЕТ
Бр. 08-1740/12
18.12.2024 год.
ОКОНЧЕ

Врз основа на член 61 став 1 точка 4 од Законот за високо образование (Службен весник на Република Македонија, број 82/2018) ја давам следната

ИЗЈАВА

за давање согласност за учество во изведување на настава по одредени предмети од студиската програма на втор циклус студии по

Sustainable energy and environment

Јас Атанаско Тунески избран во звање редовен професор и вработен на Машински факултет во Скопје на Универзитетот „Св. Кирил и Методиј“ во Скопје давам согласност за учество во изведување на настава од Студиската програма **Sustainable energy and environment** на Машинскиот факултет во Скопје, по наставните предмети:

1. Modeling and Simulations of Energy Systems
2. Advanced Course in Energy Transformation
3. Environmental Systems Analysis

Скопје, 16.12.2024

Подносител на изјава



Република Северна Македонија
 УНИВЕРЗИТЕТ "СВ. КИРИЛ И МЕТОДИЈ" - СКОПЈЕ
 МАШИНСКИ ФАКУЛТЕТ
 Бр. 08-1770/1
 18-12-2024 20 год.
 С К О П Ј Е

ОБ.2 Елаборат за акредитирање на студиска програма од втор циклус

4. Изјава од наставникот за давање согласност за учество во изведување на настава по одредени предмети од студиската програма

Врз основа на член 61 став 1 точка 4 од Законот за високо образование (Службен весник на Република Македонија, број 82/2018) ја давам следната

ИЗЈАВА

за давање согласност за учество во изведување на настава по одредени предмети од студиската програма на втор циклус студии по

Sustainable energy and environment

Јас Зоран Марков, избран во звање редовен професор и вработен на Машински факултет во Скопје на Универзитетот „Св. Кирил и Методиј“ во Скопје давам согласност за учество во изведување на настава од Студиската програма **Sustainable energy and environment** на Машинскиот факултет во Скопје, по наставните предмети:

1. Modeling and Simulations of Energy Systems
2. Advanced Course in Energy Transformation
3. Fluid Mechanics in Environmental Engineering
4. Water and Waste Water Treatment
5. Design of fluid conveying and hydropower system

Скопје, 7.12.2024

Подносител на изјава



APPENDIX NO. 3

1. Subject programs with information in accordance with Article 4 of the Regulation on the content of study programs ("Official Gazette of the Republic of Macedonia", no. 79 /20 23)

Add. 3		Course program for the second level (second cycle - postgraduate) of studies				
1.	Course title		Selected topics in Mathematics and Informatics			
2.	Code		OMI1001			
3.	Study group(s)		SEE			
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		I / winter	7.	ECTS credits	6
8.	Professor(s)		Prof. dr. Aleksa Malcheski Prof. dr. Nikola Tuneski Prof. dr. Bojan Prangoski			
9.	Prerequisites for enrolling the course		None			
10.	Course objectives (competences): Introduction to selected topics in applied mathematics, probability and statistics and selected software for solving engineering problems.					
11.	Course content: Selected topics in linear algebra, numerical methods, optimization methods, complex analysis, probability and statistics with emphasis on solving technical problems. Using specific programming techniques, software and basics of organizing data and intelligent systems.					
12.	Study methods: lectures, lab, project assignments, individual assignments, self-study.					
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			40	
	17.3.	Attendance			10	
18.	Grading scale		Under 50		5 (five) (F)	
			51 - 64 points		6 (six) (E)	
			65 - 74 points		7 (seven) (D)	
			75 - 84 points		8 (eight) (C)	
			85 - 94 points		9 (nine) (B)	
			95 - 100 points		10 (ten) (A)	
19.	Prerequisites for taking the final exam		Activity 16.1, 16.2, 16.3			
20.	Language		English			
21.	Course evaluation		Student questionnaire			

22.	Textbooks					
	22.1	Instruction materials				
		No.	Author	Title	Publisher	Year
		1.	Mendenhal W., Sincich T.	Statistics for Engineering and the Sciences	Maxwell Macmillan Int. Ed., New York	1992
		2.	R. Fletcher	Practical methods of optimization	John Willey and Sons	2000
	22.2	Supplemental Instruction Materials				
		No.	Author	Title	Publisher	Year
		1.	Connolly T., Begg C.	Database systems	Ars Lamina	2010
		2.	Hari V., Rogina M., Singer S.	Numerical analysis	University of Zagreb	2003

Add. 3		Course program for the second level (second cycle - postgraduate) of studies				
1.	Course title		Modeling and Simulations of Energy Systems			
2.	Code		EE1202			
3.	Study group(s)		SEE			
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		I / winter	7.	ECTS credits	6
8.	Professor(s)		Prof. dr. Done Tashevski Prof. dr. Risto Filkoski Prof. dr. Atanasko Tuneski Prof. dr. Zoran Markov Prof. dr. Dame Dimitrovski Prof. dr. Ana Lazarevska Prof. dr. Darko Babunski Prof. dr. Emil Zaev			
9.	Prerequisites for enrolling the course		None			
10.	Course objectives (competences): Advanced knowledge of methods for energy planning and modeling energy systems. Advanced level of numerical modeling, engineering approach towards modern techniques of modeling and simulations. training for creating and using software applications for design, analysis and solving steady, unsteady and dynamic systems in the field thermal engineering and energetics. Training for making a mathematical model of a thermal power plant, object or process. applying suitable techniques for numerical modeling and simulations, analysis and interpretation of results, accuracy, stability and reliability of the model.					
11.	Course content: Introduction to modeling energy systems. Numerical thermal analysis. Mathematical modeling of thermal processes - in general. Approach in modeling. Basic equations of dynamic processes and fluid flow. Basic equations for heat transfer and defyning boundary conditions and types of boundary conditions. Method of finite volumes, solving discrete equations. Computational domain, geometry and numerical mesh. Validating mathematical models and solutions. Methods for modeling unsteady processes. Modeling, simulations and optimization of thermal processes and systems using computer tools. Using software tools for improving energy efficiency. Modeling processes related to emission and concentration of harmful substances from thermal processes. Specific functions and models for modeling thermal processes.					
12.	Study methods: lectures, lab, project assignments, individual assignments, self-study.					
13.	Total hours			6 ECTS x 30 = 180 hours		
14.	Hours allocation per activity:			30+30+10+10+100 = 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		10 hours	
		16.2.	Individual assignments		10 hours	
		16.3.	Self-study		100 hours	
17.	Points/Marks:					
	17.1.	Exams			80	
	17.2.	Projects			10	
	17.3.	Attendance			10	
18.	Grading scale		Under 50		5 (five) (F)	
			51 - 64 points		6 (six) (E)	
			65 - 74 points		7 (seven) (D)	
			75 - 84 points		8 (eight) (C)	

		85 - 94 points		9 (nine) (B)		
		95 - 100 points		10 (ten) (A)		
19.	Prerequisites for taking the final exam		Activity 17.2 and 17.3			
20.	Language		English			
21.	Course evaluation		Student questionnaire			
22.	Textbooks					
	22.1	Instruction materials				
		No.	Author	Title	Publisher	Year
		1.	Kitto J. B., Stultz S. C., editors	Steam, its generation and use, 41st Edition	Babcock&Wilcox, a McDermott comp.	2005
		2.	Baukal C. E. et al.	CFD in Industrial Combustion	CRC Press	2001
			C. Pozrikidis	Numerical Computation in Science and Engineering	Oxford University Press	1998
	22.2	Supplemental Instruction Materials				
		No.	Author	Title	Publisher	Year
		1.	Doty S., Turner W. C.	Energy Management Handbook, 7th Edition	Fairmont press Inc., CRC Press	2009
			2.	Shepherd W., Shepherd D. W.,	Energy Studies, Second Edition	Imperial College press, London
		3.	Patankar S. V.	Numerical Heat Transfer and Fluid Flow	Hemisphere Publ. Corp.	1980

Add. 3		Course program for the second level (second cycle - postgraduate) of studies				
1.	Course title		Advanced Course in Energy Transformation			
2.	Code		SEE1101			
3.	Study group(s)		SEE			
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		I / winter	7.	ECTS credits	6
8.	Professor		Prof. dr. Done Tashevski Prof. dr. Risto Filkoski Prof. dr. Atanasko Tuneski Prof. dr. Zoran Markov Prof. dr. Dame Dimitrovski Assoc. prof. Igor Shesho Assoc. prof. Viktor Iliev			
9.	Prerequisites for enrolling the course		None			
10.	Course objectives (competences): Learning advanced methods for renewable energy usage. Specific knowledge of small hydro, wind, tidal, wave, solar, geothermal and biomass energy transformation					
11.	Course content: Overview of advanced renewable energy resources. Energy of inland water bodies. Tidal energy development. Methods and parameters for selection and design of wind turbines. Numerical modeling. State-of-the-art trends and designs in renewable energy. Production price. Solar energy panels with and without radiation concentration. Types of geothermal energy sources, Technologies and drilling equipment. Low temperature energy sources. Biomass sources. Forests, agriculture, municipal and industrial waste. Energy potential. Biogas fuels.					
12.	Study methods: team work on project assignments, self running assignments					
13.	Total hours			10 ECTS x 30 hours = 300 hours		
14.	Hours allocation per activity:			45+45+45+45+120=300		
15.	Lectures/Lab	15.1.	Lectures		45 hours	
		15.2.	Lab (student work)		45 hours	
16.	Project Work/Assignments	16.1.	Project assignments		45 hours	
		16.2.	Individual assignments		45 hours	
		16.3.	Self-study		120 hours	
17.	Points/Marks:					
	17.1.	Exams				40
	17.2.	Projects				50
	17.3.	Attendance				10
18.	Grading scale		Under 50		5 (five) (F)	
			51 - 60 points		6 (six) (E)	
			61 - 70 points		7 (seven) (D)	
			71 - 80 points		8 (eight) (C)	
			81 - 90 points		9 (nine) (B)	
			91 - 100 points		10 (ten) (A)	
19.	Prerequisites for taking the final exam					
20.	Language of Instruction		English			

21.	Course evaluation		Student questionnaire			
22.	Textbooks					
	22.1	Instruction materials				
		No.	Author	Title	Publisher	Year
		1.	Aubrecht G. J.	Energy: Physical, Environmental and Social Impact	Pearson	2006
		2.		Renewable Energy	OECD/IEA	2004
		3.				
	22.2	Supplemental Instruction Materials				
		No.	Author	Title	Publisher	Year
		1.	Pilic-Rabadan L.	Vodne turbine, pumpe i vjetroturbine	Sveuciliste u Splitu	2000
	2.					

Add. 3		Course program for the second level (second cycle - postgraduate) of studies				
1.	Course title		Experts in Teamwork (EiT)			
2.	Code		SEE1201			
3.	Study group(s)		SEE			
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		I / winter	7.	ECTS credits	10
8.	Professor		Prof. dr. Dame Dimitrovski			
9.	Prerequisites for enrolling the course		None			
10.	Course objectives (competences): Experts in Teamwork is a course in which students apply their academic competence in interdisciplinary project work to learn cooperative skills that can be transferred to the workplace. Relevant issues from society and working life form the basis for the project work, and the student teams should work together with external partners. The student team must adapt the project that the team members choose, to suit their combined competence and the theme of the group. Students develop teamwork skills by reflecting on and learning from specific cooperative situations in their project work. Reflections are shared by the team and are stimulated by facilitation, reflection writings, interaction exercises, and feedback to each other.					
11.	Course content: Students in EiT are divided into groups of students, and each group is divided into interdisciplinary teams of five to six students. Each group is headed by a professor, called the group supervisor. Each group has a broad overall academic theme related to societal issues or challenges from working life. This theme forms the basis for the student team's project work. The group may have external partners that represent the theme, and that may be advisers and recipients of the students' work. The desired combination of academic competencies in the group is specified as a guide to help students choose a group.					
12.	Study methods: team work on project assignments, selfrunning assignments					
13.	Total hours			10 ECTS x 30 hours = 300 hours		
14.	Hours allocation per activity:			45+45+45+45+120=300		
15.	Lectures/Lab	15.1.	Lectures		45 hours	
		15.2.	Lab (student work)		45 hours	
16.	Project Work/Assignments	16.1.	Project assignments		45 hours	
		16.2.	Individual assignments		45 hours	
		16.3.	Self-study		120 hours	
17.	Points/Marks:					
	17.1.	Exams			40	
	17.2.	Projects			50	
	17.3.	Attendance			10	
18.	Grading scale		Under 50		5 (five) (F)	
			51 - 60 points		6 (six) (E)	
			61 - 70 points		7 (seven) (D)	
			71 - 80 points		8 (eight) (C)	
			81 - 90 points		9 (nine) (B)	
			91 - 100 points		10 (ten) (A)	
19.	Prerequisites for taking the final exam		Activity 16.1 and 16.2			
20.	Language of Instruction		English			
21.	Course evaluation		Student questionnaire			
22.	Textbooks					

	22. 1	Instruction materials				
		No.	Author	Title	Publisher	Year
		1.	Bjørn Sortland, http://www.ntnu.edu/eit	Course materials 2014, NTNU, Norway	NTNU	2014
		2.				
		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		Thermal power plants – advanced level 1			
2.	Code		TEI2113			
3.	Study group(s)		SEE			
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)		Second			
6.	Academic year / semester		I / winter	7.	ECTS credits	6
8.	Professor		Prof. dr. Done Tashevski			
9.	Prerequisites		None			
10.	Course objectives (competences): Profound knowledge of modern facilities that analyze, design, analysis and selection of advanced equipment, technical control, supervision and inspection during construction, exploitation and maintenance, environmental protection					
11.	Course content: Modernization of plants with increased energy efficiency; combined cycle cogeneration plants; plants with triple loop-three generation; plants MHDG; hydrogen as fuel; thermal balances; efficiency coefficient; equipment; economic and environmental aspects					
12.	Study methods:					
13.	Total hours			6 ECTS x 30 = 180 hours		
14.	Hours allocation per activity:			30+45+40+30+35= 180 hours		
15.	Lectures/Lab	15.1.	Lectures (15 week x 2)	30 hours		
		15.2.	Lab (student work)	45 hours		
16.	Project Work/Assignments	16.1.	Project assignments	40 hours		
		16.2.	Individual assignments	30 hours		
		16.3.	Self-study	35 hours		
17.	Points/Marks:					
	17.1.	Tests			50 points	
	17.2.	Projects			50 points	
	17.3.	Attendance			-	
18.	Grading scale		Under 50		5 (five) (F)	
			51 - 60 points		6 (six) (E)	
			61 - 70 points		7 (seven) (D)	
			71 - 80 points		8 (eight) (C)	
			81 - 90 points		9 (nine) (B)	
			91 - 100 points		10 (ten) (A)	
19.	Prerequisites for taking the final exam		Accomplished 16.1 and 16.2			
20.	Language		English			
21.	Course evaluation		Student questionnaire			
22.	Textbooks					
	22.1.	Instruction materials				
		No.	Author	Title	Publisher	Year
		1.	L. Drbal et al.	Power Plant Engineering	Black&Veatch, Chapman&Haal, New York	1996
		2.	Klas Jonhagen:	„Modern Thermal Power Plant-Aspects on Modelling	Lund University	January, 2011, Sweden

				and Evaluation"		
	22. 2.	Supplemental Instruction Materials				
		No.	Author	Title	Publisher	Year
		1.	B.W.Wilkinson, R.W.Barnes	Cogeneration of Electricity and Useful Heat	CRC Press, Inc, Boca Raton, Florida	1980

Add. 3		Course program for the second level (second cycle - postgraduate) of studies			
1.	Course title	Advanced thermodynamics - selected chapters			
2.	Code	TEI1101			
3.	Study group(s)	SEE			
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	I / winter	7.	ECTS credits	6
8.	Professor	Prof. d-r Risto Filkoski			
9.	Prerequisites for enrolling the course	None			
10.	Course objectives (competences): To obtain knowledge of the advanced topics in applied thermodynamics and heat transfer related to mechanical engineering, with emphasize to thermal power engineering and environmental protection. The course includes additional thermodynamics relations, including advanced thermodynamic cycles, two- and three-component systems and their applications. The course also covers advanced topics in conduction, convection and radiation heat transfer and related industrial applications. Advanced methods of modelling techniques of fluid flow, turbulence, combustion and heat transfer in engineering applications, with emphasize on numerical modelling. Engineering and scientific approach to the advanced techniques of modelling and simulation of thermal processes. Ability to create and use software applications for design, energy efficiency analysis and operating problems solution of steady-state and dynamic systems in the field of thermal and power engineering.				
11.	Course content: Thermodynamics of irreversible processes. Second law of the classical thermodynamics and irreversible processes. Entropy. Thermodynamic potentials, Helmholtz energy, Gibbs energy, chemical potential, Maxwell relations. Multi-phase systems, phase changes. Chemical equilibrium. Energy and exergy analysis of thermal engineering systems Real gases, Van der Waals equation of state of real gases, equation of corresponding states and other equations. Liquid state. Internal pressure, surface stress and capillary phenomenon. Third law of classical thermodynamics, extensivity, entropy.Flow of compressible fluids. Mixtures and mixing. Binary solutions. Thermodynamics of two- and three component systems. Thermo-mechanical transformations. Thermodynamic processes in thermal machines, facilities and plants. Advanced thermodynamic cycles. Thermodynamic efficiency of the processes, maximal work, maximal technical work - exergy, exergy balance, energy analysis, Grassmann diagram for exergy flow Mass and energy balance of combustion process. Kinetics and dynamics of the combustion process of solid, liquid and gaseous fuels. Heat transfer topics and efficiency. Theory of similarity. Heat transfer in different applications in power engineering and process industry. Selected chapters on fluid flow, turbulence, combustion and heat transfer processes. Computational fluid dynamics (CFD) and computational thermal analysis (CTA). The finite volume method. Discretisation of the governing equations and numerical solution. Numerical domain, object geometry, numerical grid and its evaluation. Modelling of flow processes with chemical reactions. Modelling of combustion. Modelling of heat transfer with CFD/CTA. Convection. Radiation energy transfer. Equation for radiation energy transfer. Modelling of thermal radiation heat transfer by different methods. Time-dependant flow modelling, modelling of transitional processes. CFD technique as a tool for modelling operation of burners, combustors, combustion chambers, boiler plants, industrial furnaces (ovens), other industrial facilities and devices. Modelling of the formation and reduction of air pollutants (CO, NO_x, SO₂, etc.).				
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 hours = 180 hours			
14.	Hours allocation per activity:	30+30+35+15+60 = 180 hours			
15.	Lectures/Lab	15.1.	Lectures (15 week x 2)		30 hours

		15.2.	Lab (student work)	30 hours		
16.	Project Work/Assignments	16.1.	Project assignments	35 hours		
		16.2.	Individual assignments	15 hours		
		16.3.	Self-study	60 hours		
17.	Points/Marks:					
	17.1.	Exams		50 points		
	17.2.	Projects		45 points		
	17.3.	Attendance		5 points		
18.	Grading scale		Under 50	5 (five) (F)		
			51 - 60 points	6 (six) (E)		
			61 - 70 points	7 (seven) (D)		
			71 - 80 points	8 (eight) (C)		
			81 - 90 points	9 (nine) (B)		
			91 - 100 points	10 (ten) (A)		
19.	Prerequisites for taking the final exam		Activities 15.2 and 16.1			
20.	Language		English			
21.	Course evaluation		Student questionnaire			
22.	Textbooks					
	22.1	Instruction materials				
		No.	Author	Title	Publisher	Year
		1.	D. E. Winterbone, A. Turan	Advanced Thermodynamics for Engineers, 2nd ed.	Elsevier	2015
		2.	Y. A. Cengel, M. A. Boles	Thermodynamics : An Engineering Approach, 8th Edition	McGraw-Hill Companies	2015
		3.	M.J. Moran, H.N. Shapiro, D.D. Boettner, N.B. Bailey	Fundamentals of Engineering Thermodynamics , 8 ed.	John Wiley & Sons	2014
	22.2	Supplemental Instruction Materials				
		No.	Author	Title	Publisher	Year
		1.	Baukal C.E. et al.	Heat Transfer in Industrial Combustion	CRC Press	2000
		2.	K. Annamalai , I. K. Puri, M. A. Jog,	Advanced Engineering Thermodynamics	CRC Press, 2nd edition	2011
		3.	M. O. Abdullah	Applied energy - an introduction	CRC Press, Taylor & Francis Group	2013

Add. 3		Course program for the second level (second cycle - postgraduate) of studies					
1.	Course title			Transport and the environment			
2.	Code			EE2104			
3.	Study group(s)			SEE			
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			I / winter	7.	ECTS credits	6
8.	Professor			Prof. d-r Dame Dimitrovski			
9.	Prerequisites for enrolling the course			None			
10.	Course objectives (competences): Analytical approach to combustion in IC engines, modeling IC engines and technologies for reduction of exhaust emissions. Calculation of real cycles, measuring performance and pollution.						
11.	Course content: Learning the real processes in IC engines, forming pollutants in the chamber of the engine, pollutant behavior after combustion, technologies for pollution reduction in vehicles etc.						
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 (15week 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				45	
	17.3.	Attendance				5	
18.	Grading scale		Under 50			5 (five) (F)	
			51 - 60 points			6 (six) (E)	
			61 - 70 points			7 (seven) (D)	
			71 - 80 points			8 (eight) (C)	
			81 - 90 points			9 (nine) (B)	
			91 - 100 points			10 (ten) (A)	
19.	Prerequisites for taking the final exam		Presented projects				
20.	Language of Instruction		English				
21.	Course evaluation		Student questionnaire				
22.	Textbooks						
	22.1	Instruction materials					
		No.	Author	Title	Publisher	Year	
		1.	Mile Dimitrovski, Dame Dimitrovski	ECOGAS software	Internal issue	2010	
		2.	Jeremy Colls	Air polution	ISBN 0203-4762-6	2007	
	22.2	Supplemental Instruction Materials					
No.		Author	Title	Publisher	Year		

		1.	Handbook of Air Pollution from Internal Combustion Engines: Pollutant Formation and Control	Eran Sher	Academic Press	1998
		2.	Transport and the environment	R. E. Hester, R. M. Harrison	RS.C advanced chemical science	2006

Add. 3		Course program for the second level (second cycle - postgraduate) of studies					
1.	Course title			Fluid Mechanics in Environmental Engineering			
2.	Code			SEE2101			
3.	Study group(s)			SEE			
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)			Second			
6.	Academic year / semester			I / winter	7.	ECTS credits	6
8.	Professor(s)			Prof. dr. Zoran Markov			
9.	Prerequisites			None			
10.	Course objectives (competences): Learn how to analyze fluid flows in environmental engineering, simulate flows and investigate turbulence and boundary layer problems						
11.	Course content: Concepts of fluid properties, viscous flow analysis, turbulence, boundary layers, computational fluid dynamics						
12.	Study methods: lectures, lab, project assignments, individual assignments, self-study.						
13.	Total hours			6 ECTS x 30 hours = 180 hours			
14.	Hours allocation per activity:			30 + 15 + 40 + 30 + 65 = 180 hours			
15.	Lectures/Lab	15.1.	Lectures (15weeks x 2)		30 hours		
		15.2.	Lab (student work)		15 hours		
16.	Project Work/Assignments	16.1.	Project assignments		40 hours		
		16.2.	Individual assignments		30 hours		
		16.3.	Self-study		65 hours		
17.	Points/Marks:						
	17.1.	Exams				40	
	17.2.	Projects				50	
	17.3.	Attendance				10	
18.	Grading scale		Under 50		5 (five) (F)		
51 - 60 points			6 (six) (E)				
61 - 70 points			7 (seven) (D)				
71 - 80 points			8 (eight) (C)				
81 - 90 points			9 (nine) (B)				
91 - 100 points			10 (ten) (A)				
19.	Prerequisites for taking the final exam		Activity 16.1				
20.	Language		English				
21.	Course evaluation		Student questionnaire				
22.	Textbooks						
	22.1.	Instruction materials					
		No.	Author	Title		Publisher	Year

		1.	Rubin H., Atkins on J.	Environmental Fluid Mechanics	Marcel Dekker Inc.	2001
		2.	Hirsch C.	Numerical Computation of Internal and External Flows: The Fundamentals of Computational Fluid Dynamics	Butterworth-Heinemann	2007
		Supplemental Instruction Materials				
	22.2.	N o.	Author	Title	Publisher	Year
		1.	White F. M.	Fluid Mechanics	Mc-Graw Hill	2008

Add. 3		Course program for the second level (second cycle - postgraduate) of studies				
1.	Course title			Environmental Measurement methods and Monitoring Systems		
2.	Code			SEE2102		
3.	Study group(s)			SEE		
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)			Second		
6.	Academic year / semester			I / winter	7.	ECTS credits 6
8.	Professor(s)			Prof dr. Darko Babunski		
9.	Prerequisites			None		
10.	Course objectives (competences): Learn to implement of the dimensional analysis and theory of similarity, to implement of the measurement instrumentation, accuracy of measurements, presentation of the results, Methods and instrumentation for the pressure, flow direction and velocity, discharge, temperature, movement, force and power. Data acquisition hardware & software systems in environmental engineering Software packages for monitoring and control of environmental engineering processes.					
11.	Course content: Implementation of dimensional analysis. Implementation the theory of similarity. Implementation of the measurement instrumentation. Accuracy of the measurements and presentation of the results. Pressure measurement. Measurement of the fluid flow direction and flow velocity. Discharge measurement. Temperature measurement. Measurement of concentration and particle size distribution of granular materials, force and power. Analysis of the advantages and disadvantages of continuous environmental monitoring. Comparison of sensors and instruments for continuous monitoring and field measurement. Analysis of the systems for continuous monitoring and control of environmental pollution. Monitoring of municipal and industrial wastewater. Measurement data analysis and techniques. Automatic monitoring stations for municipal and industrial wastewater. Air monitoring: air pollution monitoring and testing equipment, ambient air monitoring, and automatic air pollution monitoring systems.					
12.	Study methods: lectures, lab, project assignments, individual assignments, self-study.					
13.	Total hours			6 ECTS x 30 = 180 hours		
14.	Hours allocation per activity:			30+15+40+30+65= 180 hours		
15.	Lectures/Lab	15.1.	Lectures (15 weeks x 2)		30 hours	
		15.2.	Lab (student work)		15 hours	
16.	Project Work/Assignments	16.1.	Project assignments		40 hours	
		16.2.	Individual assignments		30 hours	
		16.3.	Self-study		65 hours	
17.	Points/Marks:					
	17.1.	Exams			40	
	17.2.	Projects			50	
	17.3.	Attendance			10	
18.	Grading scale		Under 50		5 (five) (F)	
			51 - 60 points		6 (six) (E)	
			61 - 70 points		7 (seven) (D)	
			71 - 80 points		8 (eight) (C)	
			81 - 90 points		9 (nine) (B)	
			91 - 100 points		10 (ten) (A)	
19.	Prerequisites for taking the final exam			Activity 16.1		

20.	Language			English		
21.	Course evaluation			Student questionnaire		
22.	Textbooks					
	22.1.	Instruction materials				
		No.	Author	Title	Publisher	Year
		1.	Randy D. Down, Jay H. Lehr	Environmental Instrumentation and Analysis Handbook	Wiley Interscience, Hoboken, NJ	2005
		2.	Doebe lin E. O.:	Measurement Systems - Application and Design	McGraw-Hill, NY	2002
	3.	F. R. Bourden, D. Donnet, T. Godish, I. McKelvie	Environmental Monitoring Handbook	McGraw Hill	2004	
	22.2.	Supplemental Instruction Materials				
		No.	Author	Title	Publisher	Year
		1.	G. Bruce Wiersma	Environmental Monitoring	CRC Press	2004
		2.	Janick Artiola, Ian Pepper, Mark Brusseau	Environmental Monitoring and Characterization	Elsevier Academic Press	2004

Add. 3		Course program for the second level (second cycle - postgraduate) of studies				
1.	Course title		Environmental Systems Analysis			
2.	Code		SEE2103			
3.	Study group(s)		SEE			
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)		Second			
6.	Academic year / semester		I / winter	7.	ECTS credits	6
8.	Professor		Prof. dr. Atanasko Tuneski			
9.	Prerequisites		None			
10.	Course objectives (competences): Acquire knowledge of: - Eleven environmental systems analysis tools: environmental impact assessment (EIA), strategic environmental assessment (SEA), life cycle assessment (LCA), positional analysis (PA), cost-benefit analysis (CBA), material intensity per unit service (MIPS) analysis, total material requirement (TMR) analysis, ecological footprint (EF), exergy analysis, emergy analysis and risk assessment (RA) for chemicals. - Case study where different environmental systems analysis tools are implemented.					
11.	Course content: DESCRIPTION OF THE ENVIRONMENTAL SYSTEMS ANALYSIS TOOLS. Selecting questions and tools. Environmental Impact Assessment (EIA). Strategic Environmental Assessment (SEA). Life Cycle Assessment (LCA). Positional Analysis (PA). Cost-Benefit Analysis (CBA). Material Intensity per Unit Service (MIPS). Total Material Requirement (TMR). Ecological Footprint (EF). Exergy analysis. Emergy analysis. Risk Assessment (RA) CASE STUDY. Introduction to the case study. Inventory data. Environmental systems analysis (Choice of tools, LCA calculations. MIPS calculations. Ecological footprint calculations. Exergy calculations. Discussion of the case study results DISCUSSION AND CONCLUSION. Natural resource use. Environmental impacts. Natural resource use and environmental impacts. Usability. Integration. Conclusions					
12.	Study methods: lectures, lab, project assignments, individual assignments, self-study.					
13.	Total hours		6 ECTS x 30 = 180 hours			
14.	Hours allocation per activity:		30 + 15 + 40 + 30 + 65 = 180 hours			
15.	Lectures/Lab	15.1.	Lectures (15 weeks x 2)		30 hours	
		15.2.	Lab (student work)		15 hours	
16.	Project Work/Assignments	16.1.	Project assignments		40 hours	
		16.2.	Individual assignments		30 hours	
		16.3.	Self-study		65 hours	
17.	Points/Marks:					
	17.1.	Exams			40	
	17.2.	Projects			50	
	17.3.	Attendance			10	
18.	Grading scale		Under 50		5 (five) (F)	
			51 - 60 points		6 (six) (E)	
			61 - 70 points		7 (seven) (D)	
			71 - 80 points		8 (eight) (C)	
			81 - 90 points		9 (nine) (B)	
			91 - 100 points		10 (ten) (A)	

19.	Prerequisites for taking the final exam		Activity 16.1			
20.	Language		English			
21.	Course evaluation		Student questionnaire			
22.	Textbooks					
	22.1	Instruction materials				
		No.	Author	Title	Publisher	Year
		1.	Charles H. Eccleston	Environmental Impact Assessment: A Guide to Best Professional Practices	CRC Press	2011
		2.	John Glasson, Riki Therivel, Andrew Chadwick	Introduction To Environmental Impact Assessment (Natural and Built Environment Series)	Routledge	2012
		3.	Walter Klopffer, Birgit Grahl	Life Cycle Assessment (LCA)	Wiley-VCH	2014
	22.2	Supplemental Instruction Materials				
		No.	Author	Title	Publisher	Year
		1.	Glasson J., Therivel R. and Chadwick A.	Introduction to Environmental Impact Assessment. Principles and procedures, process, practice and prospects.	The Natural and Built Environment Series. T.J. International Ltd, Padstow, UK	1999
		2.	Odum, H.T.	Environmental Accounting - Emergy and environmental decision making	John Wiley & Sons, Inc., New York.	1996

Add. 3		Course program for the second level (second cycle - postgraduate) of studies					
1.	Course title			An Introduction to Eco-innovations			
2.	Code			SEE2104			
3.	Study group(s)			SEE			
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			I / winter	7.	ECTS credits	6
8.	Professor			Prof. dr Atanas Kochov			
9.	Prerequisites for enrolling the course			None			
10.	Course objectives (competences): This course will contribute toward retains the invaluable core message that eco-innovation and technologies which will contribute toward the sustainable development, have become central to debates about environment and economic development. Containing a substantial number of new boxed case studies, learning outcomes, chapter summaries, discussion questions, further reading and websites, studying and analyzing models of clean technologies, resource efficiency, business models for implementation, this course will provide an essential introduction for students and their competences for developing projects and case studies for sustainable development.						
11.	Course content: This course places stronger emphasis on the global challenges of eco-innovation, clean technologies, resource efficiency and proper usage of resources. The models and tools for eco-innovation approach, business models that should apply will be presented. The course provokes students toward new consideration to the challenge of achieving sustainable development by introducing eco-innovation technologies in to the production processes, and contribute toward the lower carbon growth, climate adaptation and development of rapidly expanding economies.						
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 points		
	17.2.	Projects			30 points		
	17.3.	Attendance			10 points		
18.	Grading scale		Under 50		5 (five) (F)		
			51 - 60 points		6 (six) (E)		
			61 - 70 points		7 (seven) (D)		
			71 - 80 points		8 (eight) (C)		
			81 - 90 points		9 (nine) (B)		
			91 - 100 points		10 (ten) (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.	Sperber B.	Environmental Sound Technologies for Sustainable Development	Springer-Verlag	2008
		2.	Luken R., Rompaey F.	Environment and Industry in Developing Countries: Assessing the Adoption of Environmentally Sound Technology	Unido Press	2007
		3.	Hermiosilla J., Gonzales P.	Eco-innovation: Sustainability and Competitiveness	MacMillan Publ.	2009
	22.2	Supplemental Instruction Materials				
		No.	Author	Title	Publisher	Year
		1.	David R. Godschalk	Sustainable Development Projects: Integrating Design, Development, and Regulation	APA Planners Press;	1 edition (April 7, 2014)

Add. 3		Course program for the second level (second cycle – postgraduate) of studies			
1.	Course title	Energy economics			
2.	Code	TEI2226			
3.	Study group(s)	Sustainable energy and environment			
4.	The organizer of the study program (unit, institute, department)	“Ss. Cyril and Methodius” University in Skopje, Faculty of Mechanical Engineering - Skopje, Institute for Manufacturing Engineering and Management			
5.	Level (first, second, third degree)	second			
6.	Academic year / semester	academic year	1	semester	winter and summer
7	ECTS credits	6			
8.	Professor	Associate professor Igor Shesho			
9.	Language	English			
10.	Prerequisites for enrolling the course	-			
11.	Course objectives (competences)	Definition of economically efficient technologies, by conducting a detailed techno-economic analysis with the selection of optimal technology for energy conversion processes. Analysis and optimization during the definition of systems (devices) for the implementation of renewable energy sources in new and existing systems for: electricity production (thermal energy plants), heating, cooling, air conditioning, industrial technological processes. Acquiring knowledge on calculation of LCOE (Levelized Cost of Electricity), net present value (NPV), internal rate of return (IRR) conducting analysis of life costs - Life Cycle Cost Analysis. Using economic software (SAM-System Advisor Model) for the analysis of investments in renewable energy sources			
12.	Detailed content of the course	Study of the methodology for calculation of LCOE (Levelized Cost of Electricity), net present value (NPV), internal rate of return (IRR), analysis of life costs - Life Cycle Cost Analysis. Application of economic software (SAM-System Advisor Model) for the analysis of investments in systems for the transformation of renewable energy sources with application to: electricity production (thermal energy plants), heating, cooling, air conditioning, industrial technological processes.			
13	Connection with other courses	/			
14.	Study methods	Interactive lectures, auditory and/or laboratory practice, self running and/or teamwork on project assignments, self running assignments			
15.	Total hours	6 ECTS x 30 hours=180 hours			
16.	Lectures/Lab	16.1.	Lectures		30 hours
		16.2.	Lab (student work)		30 hours
		16.3.	Practice		0 hours
17.	Project Work/Assignments	17.1.	Project assignments		30 hours
		17.2.	Individual assignments		30 hours
		17.3.	Self-study		60 hours
18	Prerequisites for taking the final exam	Seminar work delivered and approved			
19	Points / Marks				
	19.1.	Partial exams (points)			0
	19.2.	Projects (points)			50
	19.3.	Final exam (points)			50

20	Grading scale			Under 50	5 (five) (F)	
				51 - 64 points	6 (six) (E)	
				65 - 74 points	7 (seven) (D)	
				75 - 84 points	8 (eight) (C)	
				85 - 94 points	9 (nine) (B)	
				95 - 100 points	10 (ten) (A)	
21.	Course evaluation			Student questionnaire		
22.	Textbooks					
	22.1.	Instruction materials				
		No.	Author	Title	Publisher	Year
		1.	Multiple authors edited by Arzu Şencan Şahin	Modeling and Optimization of Renewable Energy Systems	Intech	2012
		2.	Walter Short, Daniel J. Packey, and Thomas Holt	A Manual for the Economic Evaluation of Energy Efficiency and Renewable Energy Technologies	National Renewable Energy Laboratory	1995
		3.	Jefferson W. Tester, Elisabeth M. Drake, Michael J. Driscoll, Michael W. Golay	Sustainable energy: choosing among options	Ars Lamina	2012
		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			Water and Waste Water Treatment			
2.	Code			SEE2201			
3.	Study group(s)			SEE			
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)			Second			
6.	Academic year / semester			I / summer	7.	ECTS credits	6
8.	Professor			Prof. dr. Zoran Markov			
9.	Prerequisites			None			
10.	Course objectives (competences): Learn how to water treatment works, operation in municipal and industrial treatment plant						
11.	Course content: Water treatment technologies, water quality parameters, waste water treatment, activated sludge processes, water quality laws and regulations						
12.	Study methods: lectures, lab, project assignments, individual assignments, self-study.						
13.	Total hours				6 ECTS x 30 = 180 hours		
14.	Hours allocation per activity:				30 + 15 + 40 + 30 + 65 = 180 hours		
15.	Lectures/Lab	15.1.	Lectures (15 weeks x 2)			30 hours	
		15.2.	Lab (student work)			15 hours	
16.	Project Work/Assignments	16.1.	Project assignments			40 hours	
		16.2.	Individual assignments			30 hours	
		16.3.	Self-study			65 hours	
17.	Points/Marks:						
	17. 1.	Exams					40
	17. 2.	Projects					50
	17. 3.	Attendance					10
18.	Grading scale			Under 50		5 (five) (F)	
				51 - 60 points		6 (six) (E)	
				61 - 70 points		7 (seven) (D)	
				71 - 80 points		8 (eight) (C)	
				81 - 90 points		9 (nine) (B)	
				91 - 100 points		10 (ten) (A)	
19.	Prerequisites for taking the final exam			Activity 16.1			
20.	Language			English			
21.	Course evaluation			Student questionnaire			
22.	Textbooks						
	22. 1.	Instruction materials					
		No.	Author	Title	Publisher	Year	
		1.	Lee C.C.	Handbook of Environmental Engineering Calculations	Mc-Graw Hill	2007	
		2.	Kemer F.N.	The Nalco Water Handbook	Mc-Graw Hill	1979	

	22. 2.	Supplemental Instruction Materials				
		No.	Author	Title	Publisher	Year
		1.	WEF Manual of Practice No. FD- 3	Industrial waste water managment, treatment and disposal	WEF Press	2008

Add. 3		Course program for the second level (second cycle - postgraduate) of studies				
1.	Course title		Energy efficiency			
2.	Code		SEE2202			
3.	Study group(s)		SEE			
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)		Second			
6.	Academic year / semester		I / winter	7.	ECTS credits	6
8.	Professor		Prof. dr. Done Tashevski			
9.	Prerequisites		None			
10.	Course objectives (competences): Candidates are competent for analysis, modeling, optimization and implementation of different systems for energy efficiency in different areas such as buildings, industry, agriculture and forestry, and transport with introducing a complete energy management in these areas.					
11.	Course content: Methods for analyzing modern systems for energy efficiency. Introducing the existing models for the calculation of processes and systems for energy efficiency. Ways for optimization and selection of parameters in which optimizes the system in order to meet the energy efficiency criteria. Implementation of analyzed, modeled and optimized systems to specific examples.					
12.	Study methods: lectures, lab, project assignments, individual assignments, self-study.					
13.	Total hours			6 ECTS x 30 = 180 hours		
14.	Hours allocation per activity:			30 + 15 + 40 + 30 + 65 = 180 hours		
15.	Lectures/Lab	15.1.	Lectures (15 weeks x 2)		30 hours	
		15.2.	Lab (student work)		15 hours	
16.	Project Work/Assignments	16.1.	Project assignments		40 hours	
		16.2.	Individual assignments		30 hours	
		16.3.	Self-study		65 hours	
17.	Points/Marks:					
	17.1.	Exams			40	
	17.2.	Projects			50	
	17.3.	Attendance			10	
18.	Grading scale		Under 50		5 (five) (F)	
			51 - 60 points		6 (six) (E)	
			61 - 70 points		7 (seven) (D)	
			71 - 80 points		8 (eight) (C)	
			81 - 90 points		9 (nine) (B)	
			91 - 100 points		10 (ten) (A)	
19.	Prerequisites for taking the final exam		Activity 16.1			
20.	Language		English			
21.	Course evaluation		Student questionnaire			
22.	Textbooks					
	22.1	Instruction materials				
		No.	Author	Title	Publisher	Year
		1.	D. Tashevski	Energy efficiency	Selected lectures and handouts	2014
		2.	D.R. Wulfinghoff	Energy efficiency	Energy institute press	1999

		3.	P. Bertoldi	Energy efficiency	Springer	2007
	22. 2	Supplemental Instruction Materials				
		No.	Author	Title	Publisher	Year
		1.	D.R. Wulfinghoff	Energy Efficiency Manual	Energy institute press	2000

Add. 3		Course program for the second level (second cycle - postgraduate) of studies				
1.	Course title		Eco-engines			
2.	Code		SEE2203			
3.	Study group(s)		SEE			
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		I / summer	7.	ECTS credits	6
8.	Professor		Prof. dr. Dame Dimitrovski			
9.	Prerequisites for enrolling the course		None			
10.	Course objectives (competences): Analytical approach to combustion in IC engines improving performances of engines, measuring in engines. Understanding hybrid technologies, alternative fuels for IC engines end characteristics.					
11.	Course content: Learning the contemporary models of eco engines, hybrid motor system, engines on gaseous fuels, bio fuels and new fuels. Interaction between engine construction and alternative fuels.					
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	
		15.2.	Lab (student work)		30	
16.	Project Work/Assignments	16.1.	Project assignments		30	
		16.2.	Individual assignments		30	
		16.3.	Self-study		60	
17.	Points/Marks:					
	17.1.	Exams			50	
	17.2.	Projects			45	
	17.3.	Attendance			5	
18.	Grading scale		Under 50		5 (five) (F)	
			51 - 60 points		6 (six) (E)	
			61 - 70 points		7 (seven) (D)	
			71 - 80 points		8 (eight) (C)	
			81 - 90 points		9 (nine) (B)	
			91 - 100 points		10 (ten) (A)	
19.	Prerequisites for taking the final exam		Presented projects			
20.	Language		English			
21.	Course evaluation		Student questionnaire			
22.	Textbooks					
	22.1	Instruction materials				
		No.	Author	Title	Publisher	Year
		1.	Mile Dimitrovski	ECO Engines	Internal issue	2008
		2.	Handbook of Air Pollution from Internal Combustion Engines: Pollutant	Eran Sher	Academic Press	1998

			Formation and Control			
		3.	Transport and the environment	R. E. Hester, R. M. Harrison	RS.C advanced chemical science	2006
	22. 2	Supplemental Instruction Materials				
		No.	Author	Title	Publisher	Year
		1.	The biodiesel handbook	Van Gerpen, Knothe and others	AOCS Press, Illinois	2005

Add. 3		Course program for the second level (second cycle - postgraduate) of studies				
1.	Course title		Design of fluid conveying and hydro power system			
2.	Code		SEE2204			
3.	Study group(s)		SEE			
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)		Second			
6.	Academic year / semester		I / summer	7.	ECTS credits	6
8.	Professor(s)		Prof. dr. Zoran Markov			
9.	Prerequisites		None			
10.	Course objectives (competences): Introduction to systems for hydraulic and pneumatic convey of fluids. Developing mathematical models for hydraulic calculation of the systems and their components. Introduction to systems for hydro power. Developing mathematical models for hydraulic calculation of the systems and their components.					
11.	Course content: Physical properties of fluids, water, oil, gas and mixtures of fluid - solid particles. Hydraulic and Pneumatic Conveying: calculation, devices and equipment, Hydro power systems: pump stations and hydro power plants: calculation, devices and equipment Techno-economical calculation and economic parameterisation					
12.	Study methods: lectures, lab, project assignments, individual assignments, self-study.					
13.	Total hours		6 ECTS x 30 = 180 hours			
14.	Hours allocation per activity:		30 + 15 + 40 + 30 + 65 = 180 hours			
15.	Lectures/Lab	15.1.	Lectures (15 weeks x 2)		30 hours	
		15.2.	Lab (student work)		15 hours	
16.	Project Work/Assignments	16.1.	Project assignments		40 hours	
		16.2.	Individual assignments		30 hours	
		16.3.	Self-study		65 hours	
17.	Points/Marks:					
	17.1.	Exams			40	
	17.2.	Projects			50	
	17.3.	Attendance			10	
18.	Grading scale		Under 50		5 (five) (F)	
			51 - 60 points		6 (six) (E)	
			61 - 70 points		7 (seven) (D)	
			71 - 80 points		8 (eight) (C)	
			81 - 90 points		9 (nine) (B)	
			91 - 100 points		10 (ten) (A)	
19.	Prerequisites for taking the final exam		Activity 16.1			
20.	Language		English			
21.	Course evaluation		Student questionnaire			
22.	Textbooks					
	22.1	Instruction materials				
		No.	Author	Title	Publisher	Year
	1.	Speight J.G.	Natural Gas – A Basic Handbook	Gulf Publishing Company, Houston	2007	

		2.	Oneil A. Williams	Pneumatic and Hydraulic Conveying of Solids	CRC Press	1983
		3.	G.I.Krivcenko	Hydraulic machines-turbines and pumps	Lewis publisher	1994
	22. 2	Supplemental Instruction Materials				
		No.	Author	Title	Publisher	Year
		1.	Wang X., Economides M.	Advanced Natural Gas Engineering	Gulf Publishing Company, Houston, Texas	2009
		2.	David Mills,	Pneumatic Conveying Design Guide	ELSEVIER	2004
		3.	Frank Yeaple	Fluid Power Design Handbook	CRC Press	1995

Add. 3		Course program for the second level (second cycle - postgraduate) of studies				
1.	Course title		Waste management			
2.	Code		SEE2205			
3.	Study group(s)		SEE			
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		I / summer	7.	ECTS credits	6
8.	Professor		Prof. dr Dame Dimitrovski			
9.	Prerequisites for enrolling the course		None			
10.	Course objectives (competences): Able to organize and run efficient (environmental, energy and economically) system for waste management in industry. Understanding the chain of actions for waste management system of a product or a solution for the industry or community. Understanding the applicable technologies for reducing waste, reusing waste or turning waste into a raw material for further processes.					
11.	Course content: Exploring technical models, equipment and units, regulations for efficient waste management. Systems for waste management in communities and industry. Cain of actions in waste management. Examples for waste reduction. Examples for reusing waste, turning waste into energy etc.					
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 + 15 + 45 + 45 + 45=180 hours		
15.	Lectures/Lab	15.1.	Lectures (15 weeks x 2)		30	
		15.2.	Lab (student work)		15	
16.	Project Work/Assignments	16.1.	Project assignments		45	
		16.2.	Individual assignments		45	
		16.3.	Self-study		45	
17.	Points/Marks:					
	17.1.	Exams			30	
	17.2.	Projects			60	
	17.3.	Attendance			10	
18.	Grading scale		Under 50		5 (five) (F)	
			51 - 60 points		6 (six) (E)	
			61 - 70 points		7 (seven) (D)	
			71 - 80 points		8 (eight) (C)	
			81 - 90 points		9 (nine) (B)	
			91 - 100 points		10 (ten) (A)	
19.	Prerequisites for taking the final exam		Presented projects			
20.	Language		English			
21.	Course evaluation		Student questionnaire			
22.	Textbooks					
	22.1	Instruction materials				
		No.	Author	Title	Publisher	Year
		1.	European commission	Waste management options	EC	2001
		2.	Nicholas P. Chermisinoff	Handbook of solid waste management and waste	Butterworth Heinemann	2003

				minimization technologies		
	22.2	Supplemental Instruction Materials				
		No.	Author	Title	Publisher	Year
		1.	George Tchobanoglous, Frank Kraith	Handbook of solid waste management	McGraw Hill	2002

Add. 3		Course program for the second level (second cycle - postgraduate) of studies						
1.	Course title		Energy vs. Sustainable Development: Concepts and Aspects					
2.	Code		SEE2207					
3.	Study group(s)		SEE					
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		I / summer		7.	ECTS credits		6
8.	Professor		Prof. dr. Ana M. Lazarevska					
9.	Prerequisites for enrolling the course		None					
10.	Course objectives (competences): Introduction to the sustainability concept and aspects implemented on energy systems, both on the demand and the supply side.							
11.	Course content: Introduction to the concept of Sustainable Development (SD), Indicators of SD Implementing the SD concept to energy systems. Modeling and assessment.							
12.	Study methods: Interactive lectures, guest lecturers, auditory practice, work on project assignments/case studies (team work), selfrunning assignments							
13.	Total hours			6 ECTS x 30 = 180 hours				
14.	Hours allocation per activity:			30 +15 +40 + 30 + 65 =180 hours				
15.	Lectures/Lab		15.1.	Lectures (15 weeks x 2)			30	
			15.2.	Lab (student work)			15	
16.	Project Work/Assignments		16.1.	Project assignments			40	
			16.2.	Individual assignments			30	
			16.3.	Self-study			65	
17.	Points/Marks:							
	17.1.	Exams					40	
	17.2.	Projects					50	
	17.3.	Attendance					10	
18.	Grading scale			Under 50			5 (five) (F)	
				51 - 60 points			6 (six) (E)	
				61 - 70 points			7 (seven) (D)	
				71 - 80 points			8 (eight) (C)	
				81 - 90 points			9 (nine) (B)	
				91 - 100 points			10 (ten) (A)	
19.	Prerequisites for taking the final exam			Completed activity 15.2, 16.1. and 16.2 (17.2 & 17.3)				
20.	Language of Instruction			English				
21.	Course evaluation			Student questionnaire				
22.	Textbooks							
	22.1	Instruction materials						
		No.	Author	Title		Publisher		Year
		1.	S. Bell, S. Morse	Sustainability Indicators: Measuring the immeasurable		EarthScan Publications. Ltd.		2000
		2.	T.E. Graedel , B. R. Allenby	Industrial Ecology		Pearson Education Inc.		2003

	22. 2	Supplemental Instruction Materials			
		No.	Author	Title	Publisher
		1.	UN CSD	Sustainable Development Knowledge platform	UN
		2	Organis ation of Econom ic Co- operatio n and Develop ment (OECD)	"Core Set of Indicators for Environmental Performance Reviews". A synthesis report by the Group on the State of the Environment.	Paris: 39
		3	Golay, M., Field, R., Green, Jr. W., Wright, J.C.	Introduction to Sustainable Energy (Online open course- materials)	MIT (http://ocw.mit.edu/course/s/nuclear-engineering/22-081j-introduction-to-sustainable-energy-fall-2010/)
		4	D. A. Vallero, P. A. Vesilind	Socially Responsible Engineering: Justice in Risk Management	John Wiley & Sons Inc., 2007

Add. 3		Course program for the second level (second cycle - postgraduate) of studies				
1.	Course title		Automation of environmental processes			
2.	Code		SEE2207			
3.	Study group(s)		SEE			
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)		Second			
6.	Academic year / semester		I / summer	7.	ECTS credits	6
8.	Professor(s)		Prof. dr. Emil Zaev Prof. dr. Darko Babunski			
9.	Prerequisites		None			
10.	Course objectives (competences): Acquire knowledge of: Analysis and design of automation systems for river monitoring and water and wastewater treatment processes. Acquire programming skills in the Matlab platform. Analysis, design and implementation of SCADA systems – Supervisory Control and Data Acquisition and Programmable Logic Controllers (PLC). Functionality and characteristics of environmental measurement systems to monitor and control environmental processes;					
11.	Course content: Introduction to the most commonly used types of control algorithms (sequential, continuous, On-Off and Feedforward control, feedback (P, PI and PID Control) Advanced control algorithms: adaptive, nonlinear, model control) - Examples of implementation of control algorithms in facilities for treatment of drinking water (Basic plant model: Control of pumps, coagulation dosing, pH, purification and sedimentation, filtration and chlorination) plants for wastewater treatment (Control of dissolved oxygen, depth of the sludge refiner) and general control algorithms in the plant, - Control system architecture. Supervisory Control and Data Acquisition (SCADA) and DCS systems (Introduction, SCADA / DCS software, hardware management system (PLC, RTU, Networks), OPC), - Programming and configure the Programmable Logic Controllers (PLC) control subsystem (PLC programming) - Basic instrumentation (instrumentation for measuring flow, temperature, level, pressure and analytical instrumentation).					
12.	Study methods: lectures, lab, project assignments, individual assignments, self-study.					
13.	Total hours		6 ECTS x 30 = 180 hours			
14.	Hours allocation per activity:		30 + 15 + 40 + 30 + 65 = 180 hours			
15.	Lectures/Lab	15.1.	Lectures (15 weeks x 2)		30 hours	
		15.2.	Lab (student work)		15 hours	
16.	Project Work/Assignments	16.1.	Project assignments		40 hours	
		16.2.	Individual assignments		30 hours	
		16.3.	Self-study		65 hours	
17.	Points/Marks:					
	17.1.	Exams			40	
	17.2.	Projects			50	
	17.3.	Attendance			10	
18.	Grading scale	Under 50		5 (five) (F)		
		51 - 60 points		6 (six) (E)		
		61 - 70 points		7 (seven) (D)		
		71 - 80 points		8 (eight) (C)		
		81 - 90 points		9 (nine) (B)		

			91 - 100 points		10 (ten) (A)	
19.	Prerequisites for taking the final exam		Activity 16.1			
20.	Language		English			
21.	Course evaluation		Student questionnaire			
22.	Textbooks					
	22.1	Instruction materials				
		No.	Author	Title	Publisher	Year
		1.	AWWA	Water treatment plant design	McGraw-Hill	1990
		2.	G. Tchobanobloous	Wastewater Engineering Treatment and Reuse	McGraw-Hill	2003
		3.	M.L. Davis	Water and Wastewater Engineering	McGraw Hill	2010.
	22.2	Supplemental Instruction Materials				
		No.	Author	Title	Publisher	Year
		1.	S.A.Boyer	SCADA: Supervisory Control and Data Acquisition	ISA - The Instrumentation, Systems, and Automation Society	1999
		2.	W. Bolton	Programmable Logic Controllers	Elsevier	2009

Add. 3		Course program for the second level (second cycle - postgraduate) of studies				
1.	Course title		Clean energy technologies			
2.	Code		SEE2208			
3.	Study group(s)		SEE			
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		I / summer	7.	ECTS credits	6
8.	Professor		Prof. dr. Risto Filkoski			
9.	Prerequisites for enrolling the course		None			
10.	Course objectives (competences): Acquiring knowledge about the methods and techniques for efficient utilisation of fossil and alternative fuels. Acquiring knowledge regarding energy technologies for environmental protection that apply to combustion plants. Analysis, calculation and optimal performance of combustion systems. Modelling and simulation techniques of aerodynamics, combustion and heat transfer in thermal energy systems (boilers, combustors, furnaces, heat exchangers etc.).					
11.	Course content: Properties of fossil and alternative fuels. Energy transformations of fuels: combustion, pyrolysis, gasification, liquefaction. Mass and energy balance of combustion process. Kinetics and dynamics of fuels combustion. Processing and handling of solid fuels. Methods and techniques for combustion of solid fuels, examples of application. Processing and handling of liquid and gaseous fuels. Methods and techniques for combustion of solid fuels, examples of application. Environmental considerations. Classification of pollutants, sources of plant emissions and discharges. Air pollution control. Techniques for reduction of solid particles emission. Thermodynamics and kinetics of SO ₂ formation. Methods and techniques for SO ₂ emission reduction. Thermodynamics and kinetics of NO _x formation. Methods and techniques for NO _x emission reduction. Methods and techniques for combined deSO ₂ /deNO _x . Methods for CO emission reduction. Greenhouse gases emission. Methods and techniques for reduction of GHG emission. Modelling, simulation and optimisation techniques of burners, combustion chambers, boiler plants, furnaces, thermal energy facilities. Modelling of the pollutants formation and reduction.					
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 hours = 180 hours			
14.	Hours allocation per activity:		30+ 30 + 40 + 30 + 50 = 180 hours			
15.	Lectures/Lab	15.1.	Lectures		30 hours	
		15.2.	Lab (student work)		30 hours	
16.	Project Work/Assignments	16.1.	Project assignments		40 hours	
		16.2.	Individual assignments		30 hours	
		16.3.	Self-study		50 hours	
17.	Points/Marks:					
	17.1.	Exams			50 points	
	17.2.	Projects			45 points	
	17.3.	Attendance			5 points	
18.	Grading scale		Under 50		5 (five) (F)	
			51 - 60 points		6 (six) (E)	
			61 - 70 points		7 (seven) (D)	

		71 - 80 points		8 (eight) (C)		
		81 - 90 points		9 (nine) (B)		
		91 - 100 points		10 (ten) (A)		
19.	Prerequisites for taking the final exam	Activities 15.2 and 16.1				
20.	Language	English				
21.	Course evaluation	Student questionnaire				
22.	Textbooks					
	22.1	Instruction materials				
		No.	Author	Title	Publisher	Year
		1.	Edited by J.B. Kitto and S.C. Stultz	Steam, It's generation and use, Ed. 41	The Babcock & Wilcox Compaany	2005
		2.	M. O. Abdullah	Applied Energy - an Introduction	CRC Press, Taylor & Francis Groups	2013
		3.	D. Y. Goswami, et. al., ed. by Frank Kreith	Energy Conversion	Boca Raton, CRC Press LLC	1999
		4.	Group of authors	Reference Document on Best Available Techniques for Energy Efficiency	EC-Directorate General JRC, Inst. for Prospective Technological Studies, Seville, Spain	2009
	22.2	Supplemental Instruction Materials				
		No.	Author	Title	Publisher	Year
		1.	A. Vieira da Rosa	Fundamentals of Renewable energy processes	Elsevier Academic Press	2005
		2	W. Shepherd, D.W. Shepherd	Energy Studies, Second Edition	Imperial College press, London	2005
		3.	S. Doty, W. C. Turner	Energy management Handbook, 7th Ed.	Fairmont press Inc., CRC Press	2009
4.		Filkoski R.	Modelling of energy conversion processes	Faculty of Mechanical Eng., Skopje	2011	

Add. 3		Course program for the second level (second cycle - postgraduate) of studies				
1.	Course title		Hidden Hydropower Technologies			
2.	Code		SEE2210			
3.	Study group(s)		SEE			
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		I / summer	7.	ECTS credits	6
8.	Professor		Asst. prof. dr. Marija Lazarevikj			
9.	Prerequisites for enrolling the course		None			
10.	Course objectives (competences): - Identifying hidden hydropower potential in pressurized systems (freshwater distribution networks, cooling systems, irrigation systems, process engineering) - Identifying hidden hydropower potential in open channel systems (irrigation system, wastewater, drainage channels) - Identifying hidden hydropower potential in hydro storage and in existing equipment - Understanding the interconnection between different types of hidden hydropower infrastructure and technologies - Evaluation of the main technologies for hidden hydropower based on level of development, initial investment, maintenance costs and applicability in different regions - Implementing approach for application of hidden hydropower technology at certain location.					
11.	Course content: The importance of hydropower in the energy supply. Definition of hidden hydropower. Analyzing hidden hydropower technologies in pressurized systems, hydro storage, open channel systems and in the existing equipment itself. Interconnection between different types of hidden hydropower infrastructure and technologies. Comparing existing technologies and newly developed concepts. Possibilities for integration with electricity grid and off-grid solutions. Sustainability considerations for hidden hydro technologies. Categories of possible sustainability approaches of hidden hydropower application according to their potential/application area, the technologies involved and the expected power output. Evaluation of the main technologies for hidden hydropower based on level of development, initial investment, maintenance costs and applicability in different regions.					
12.	Study methods: work on project assignments, selfrunning assignments					
13.	Total hours			6 ECTS x 30 = 180 hours		
14.	Hours allocation per activity:			30 + 15 + 40 + 30 + 65 = 180 hours		
15.	Lectures/Lab	15.1.	Lectures		30 hours	
		15.2.	Lab (student work)		15 hours	
16.	Project Work/Assignments	16.1.	Project assignments		40 hours	
		16.2.	Individual assignments		30 hours	
		16.3.	Self-study		65 hours	

17.	Points/Marks:					
	17.1.	Exams			40	
	17.2.	Projects			50	
	17.3.	Attendance			10	
18.	Grading scale		Under 50	5 (five) (F)		
			51 - 60 points	6 (six) (E)		
			61 - 70 points	7 (seven) (D)		
			71 - 80 points	8 (eight) (C)		
			81 - 90 points	9 (nine) (B)		
			91 - 100 points	10 (ten) (A)		
19.	Prerequisites for taking the final exam					
20.	Language of Instruction		English			
21.	Course evaluation		Student questionnaire			
22.	Textbooks					
	22.1	Instruction materials				
		No.	Author	Title	Publisher	Year
		1.	Ivan O. Bozhic	Renewable energy sources, small hydropower plants	University in Belgrade, Faculty of Mechanical Engineering	2022
		2.	Ingo Ball, Lea Berg, Marc J. Buiting, Dominique Courret, Laurent David, Vincent Denis, Manon Dewitte et al.	Small hydropower technologies - European state-of-the-art innovations	WIP Renewable Energies, Munich, Germany	2020
		3.				
	22.2	Supplemental Instruction Materials				
		No.	Author	Title	Publisher	Year
1.		Armando Carravetta , Shahram Derakhshan Houreh , Helena M. Ramos	Pumps as Turbines: Fundamentals and Applications	Springer	2018	
		2.				

Add. 3		Course program for the second level (second cycle - postgraduate) of studies				
1.	Course title		HVAC, refrigeration and heat pump technology			
2.	Code		SEE2211			
3.	Study group(s)		SEE			
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		I / summer	7.	ECTS credits	6
8.	Professor		Asst. prof. Aleksandar Gjasimovski			
9.	Prerequisites for enrolling the course		None			
10.	Course objectives (competences): 1) Optimization of HVAC&R systems using technoeconomic criteria 2) Understanding for advanced compressor technologies 3) Investigation of unconventional refrigeration techniques 4) Simulation of HVAC&R system performance in building environments 5) Utilization of software tools for estimation of performance of heat pumps and refrigeration machines 6) Use of a refrigerant database 7) Ventilation, air handling units, and sizing air ducts 8) District heating and cooling systems					
11.	Course content: Characteristics of traditional and advanced HVAC&R systems. Implementation of technoeconomic criteria for optimization of systems with high energy efficiency. Modern machines with different compressor technology for vapor compression refrigeration. Unconventional refrigeration systems based on absorption and ejector technology. Simulation of HVAC systems in buildings.					
12.	Study methods: team work on project assignments, selfrunning assignments					
13.	Total hours			10 ECTS x 30 hours = 300 hours		
14.	Hours allocation per activity:			45+45+45+45+120=300		
15.	Lectures/Lab	15.1.	Lectures		45 hours	
		15.2.	Lab (student work)		45 hours	
16.	Project Work/Assignments	16.1.	Project assignments		45 hours	
		16.2.	Individual assignments		45 hours	
		16.3.	Self-study		120 hours	
17.	Points/Marks:					
	17.1.	Exams			40	
	17.2.	Projects			50	
	17.3.	Attendance			10	

18.	Grading scale			Under 50		5 (five) (F)	
				51 - 60 points		6 (six) (E)	
				61 - 70 points		7 (seven) (D)	
				71 - 80 points		8 (eight) (C)	
				81 - 90 points		9 (nine) (B)	
				91 - 100 points		10 (ten) (A)	
19.	Prerequisites for taking the final exam						
20.	Language of Instruction			English			
21.	Course evaluation			Student questionnaire			
22.	Textbooks						
	22.1	Instruction materials					
		No.	Author	Title	Publisher	Year	
		1.	Šarevski V.	Heating, ventilation and air conditioning	Faculty of Mechanical Engineering	2021	
		2.	Čerepnalkovski I.	Refrigeration technology	Prosvetno delo	1995	
		3.	Milan N. Sarevski Vasko N. Šarevski	Water (R718) Turbo Compressor and Ejector Refrigeration / Heat Pump Technology	Butterworth-Heinemann	2016	
	22.2	Supplemental Instruction Materials					
		No.	Author	Title	Publisher	Year	
1.		ASHRAE	ASHRAE HANDBOOK - Heating, Ventilating, and Air-Conditioning APPLICATIONS	ASHRAE	2015		
		2.	Giuseppe Grazzini, Adriano Milazzo, Federico Mazzelli	Ejectors for efficient refrigeration	Springer	2017	

Add. 3		Course program for the second level (second cycle - postgraduate) of studies			
1.	Course title	Sustainable, Green and Just Energy Transition: Concepts and Aspects			
2.	Code	SEE2212			
3.	Study group(s)	SEE			
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	I / summer	7.	ECTS credits	6
8.	Professor	Prof. dr. Ana M. Lazarevska			
9.	Prerequisites for enrolling the course	None			
10.	Course objectives (competences): - Understanding the process of energy transition - Understanding the meaning of sustainable, green, inclusive and just energy transition - Understanding the interaction between climate action (low- or no-carbon technologies) and the sustainable green, inclusive and just energy transition and their complementarity - Identifying pathways towards achieving the sustainable, green and just energy transition - Identifying eligible technological solutions and necessary infrastructure for sustainable, green and just energy transition - Identifying indicators and their implementation to evaluate levels of achieving the sustainable, green, inclusive and just energy transition - Understanding modalities (funds, grants etc.) and opportunities for financing the sustainable, green and just energy transition - Understanding necessary governmental policies that drive the sustainable, green and just energy transition				
11.	Course content: Definition of sustainable, green, inclusive, and just energy transition. Pathways towards accelerating transition to a low-carbon economy and sustainable consumption/production Investments and open innovations for sociobioeconomy and nature-based solutions Investments in sustainable, inclusive, and resilient infrastructure Climate funds and other private capital opportunities for climate finance Climate justice via financing and technology transfer Reporting requirements for successful and measurable sustainable, green, inclusive and just energy transition Comprehensive strategies towards sustainable climate action, inclusive energy transitions, and a more equitable and resilient future for all.				
12.	Study methods: Interactive lectures, guest lecturers, auditory practice, work on project assignments/case studies (team work), selfrunning assignments				
13.	Total hours		6 ECTS x 30 = 180 hours		
14.	Hours allocation per activity:		30 +15 +40 + 30 + 65 =180 hours		
15.	Lectures/Lab	15.1.	Lectures (15 weeks x 2)	30	
		15.2.	Lab (student work)	15	
16.	Project Work/Assignments	16.1.	Project assignments	40	
		16.2.	Individual assignments	30	
		16.3.	Self-study	65	
17.	Points/Marks:				
	17.1.	Exams			40
	17.2.	Projects			50

	17.3.	Attendance			10	
18.	Grading scale			Under 50	5 (five) (F)	
				51 - 60 points	6 (six) (E)	
				61 - 70 points	7 (seven) (D)	
				71 - 80 points	8 (eight) (C)	
				81 - 90 points	9 (nine) (B)	
				91 - 100 points	10 (ten) (A)	
19.	Prerequisites for taking the final exam			Completed activity 15.2, 16.1. and 16.2 (17.2 & 17.3)		
20.	Language of Instruction			English		
21.	Course evaluation			Student questionnaire		
22.	Textbooks					
	22.1	Instruction materials				
		No.	Author	Title	Publisher	Year
		1.	IRENA	A just and inclusive energy transition in emerging markets and developing economies: Energy planning, financing, sustainable fuels and social dimensions	International Renewable Energy Agency, Abu Dhabi (https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2024/Sep/IRENA_G20_Just-transition in EMDEs 2024.pdf)	2024
		2.	Dante Dalabajan and Ruth Mayne et al.	TOWARDS A JUST ENERGY TRANSITION: Implications for communities in lower- and middleincome countries	Oxfam GB, Oxfam House, John Smith Drive, Cowley, Oxford, OX4 2JY, UK https://oxfamilibrary.openrepository.com/bitstream/handle/10546/621455/rr-just-energy-transition-071222-en.pdf;jsessionid=A6E967990993D42A48C8747F4563C7AC?sequence=11 DOI: 10.21201/2022.9936 .	2022
		3.	UNDP	Just Energy Transition: Governance needs and implications. Testing the application of a conceptual framework	UNDP (https://www.undp.org/sites/g/files/zskgke326/files/2024-01/discussion paper - just energy transition - governance needs and implications - final.pdf)	2023
	22.2	Supplemental Instruction Materials				
No.		Author	Title	Publisher	Year	
1.		Löhr, K.; Matavel, C.E.;Tadesse, S.; Yazdanpanah, M.; Sieber, S.; Komendantova, N.	Just Energy Transition: Learning from the Past for a More Just and Sustainable Hydrogen Transition in West Africa	Land 2022, 11, 2193. https://doi.org/10.3390/land11122193	2022	
	2	Miquel Muñoz Cabré, José Vega-Araújo	Considerations for a just and equitable energy transition	Stockholm+50 background paper series. Stockholm Environment Institute, https://www.sei.org/wp-content/uploads/2022/05/energy-transitions-	2022	

					stockholm50backgroundpaper.pdf	
		3	Chuan Liao, Arun Agrawal	Sustainable and just energy transition in the Global South	World Development, Volume 152, 105798, https://doi.org/10.1016/j.worlddev.2021.105798	2022
		4	Anna Creti, Zied Ftiti	Energy, just transition, and sustainability: What's new?	Energy Economics, Volume 139, 2024, 107872, https://doi.org/10.1016/j.eneco.2024.107872	2024

APPENDIX NO. 4

1. Data for persons who teach and for mentors of doctoral studies in accordance with Article 7 of the Rulebook on the content of study programs ("Official Gazette of the Republic of Macedonia", no. 79 /20 23)

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)	Atanasko Tuneski		
2.	Date of birth	22.01.1965		
3.	Scientific degree / Title	Ph.D./ Professor		
4.	Title of the scientific degree	Ph.D. in Technical Sciences		
5.	Year and institution of the scientific degree	Education	Year	Institution
		Ph.D	1997	Faculty of Mechanical Engineering - Skopje
		M.Sc	1993	Faculty of Mechanical Engineering - Skopje
		B.Sc	1989	Faculty of Mechanical Engineering - Skopje
6.	Area, field and particular specialty of master of science degree	Area	Field	Specialty
		Technical Sciences	Mechanical Engineering	Control Systems
7.	Area, field and area of doctoral degree	Area	Field	Specialty
		Technical Sciences	Mechanical Engineering	Control Systems
8.	If employed, state the institution where he/she works and the title and area in which is named	Institution		Title and area
		Faculty of Mechanical Engineering –Skopje		Full Professor, Automation
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.	Systems and Control	All programs at the Faculty of Mechanical Engineering – Skopje
		2.	Optimal Energetic Systems	Energetics and Ecology/ Faculty of Mechanical Engineering – Skopje
		3.	Environmental Monitoring and Control	Environmental and Resources Engineering Studies
		4.	Automatic Control Systems	Automatics and Control Systems, Faculty of Mechanical Engineering – Skopje
		5.	Digital Control Systems	Automatics and Control Systems, Faculty of Mechanical Engineering – Skopje
	9.2	List of courses that the teacher is lecturing in the second cycle		
No.		Course	Study program/institution	
1.		Control of Dynamic Systems	Automatics and Control Systems, Faculty of Mechanical Engineering – Skopje	

	2.	Environmental Systems Analysis	Environmental and Resources Engineering Studies	
9.3	List of courses that the teacher is lecturing in the third cycle			
	No.	Course	Study program/institution	
	1.	Advanced Control of Dynamic Systems	Mechanical engineering/Faculty of Mechanical Engineering	
	2.	Advanced Computer Control of Systems and Processes	Mechanical engineering/Faculty of 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.	Darko Babunski, Pance Bogoevski, Emil Zaev, Atanasko Tuneski	Modification of Nonlinear Hydro Power Plant Models Using Real Plant Measurements	Proceedings of the Energy, Economy, Ecology Conference, Zlatibor, Serbia, 2020
	2.			
	3.			
	4.			
	5.			
10.2.	Participation in scientific national and international projects (up to 5)			
	No.	Author	Title	Publisher/year
	1.	D. Babusnki, E. Zaev, A. Tuneski, L. Trajkovski, R. Koleva	Development of index and IoT system for Real-Time monitoring of surface water quality	Bilateral project Macedonian-Austrian, 2022-2024
	2.	E. Zaev, D. Babunski, A. Tuneski, L. Trajkovski	Development Of Concepts and Control Strategies with Improved Energy Efficiency for Hydraulic Systems in Heavy Machinery	Bilateral project Macedonian-Austrian, 2018-2020
10.3.	Printed books in the last five years (up to 5)			
	No.	Author	Title	Publisher/year
	1.	Darko Babunski, Zoran Markov, Iljco Jovanoski, Charalampos Skoulikaris, Atanasko Tuneski, Yiannis Xenidis, Antigoni Zafirakou	Water Management of Cross-border Waterbodies Possibilities for joint cooperation in coping with the challenges	Konrad Adenauer / MFS, 2020
10.4.	Printed professional papers in the last 5 years (up to 5)			
	No.	Author	Title	Publisher/year
	1.			
11.	Supervision (mentorship) of undergraduate, master and doctoral studies students			
11.1.	Undergraduate	more than 20		
11.2.	Master	3 (three)		
11.3.	Doctoral	2 (two)		
	For mentors of doctoral thesis, selected work for the last four / five years			

12.	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.				
	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.				
2.						
3.						
		4.				

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	12.03.1964		
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
		B.S. in Mathematics	1988	Faculty of Science, University Ss. Cyril and Methodius, Skopje
		M.Sc. in Theoretical Mathematics	1996	Faculty of Science, University Ss. Cyril and Methodius, Skopje
		Ph.D. in Theoretical Mathematics	2002	Faculty of Science, University of Novi Sad, Novi Sad, Serbia
6.	Area, field and particular specialty of master of science degree	Area	Field	Specialty
		Mathematics	Complex Analysis	Bounded analytic functions
7.	Area, field and area of doctoral degree	Area	Field	Specialty
		Mathematics	Functional analysis	Banach spaces, normed spaces
8.	If employed, state the institution where he/she works and the title and area in which is named	Institution	Title and area	
		Faculty of Mechanical Engineering, Dept. of Mathematics and Informatics, University "Ss. Cyril and Methodius"	Full 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 on MFS
		2.	Mathematics 2	All on MFS
	9.2	List of courses that the teacher is lecturing in the second cycle		
		No.	Course	Study program/institution
		1.	Numerical mathematics	All on MFS
		2.	Methods of optimization	All on MFS
	9.3	List of courses that the teacher is lecturing in the third cycle		
		No.	Course	Study program/institution
		1.	/	/
10.	Selected work in the past five years			
10.1.	Relevant scientific printed paper (up to 5)			
	No.	Author	Title	Publisher/year
	1.	S.Brsakoska, A.Malcheski	Space Of Solutions Of Linear Differential Equations Of Second Order As 2-Normed Space	Balkan Journal of Applied Mathematics and Informatics , 2021
	2.	S.Brsakoska, A.Malcheski	Extension Of Two Sided Branch 2-Subspace And Some Extensions Of Hahn - Banach Type For Skew-Symmetric 2- Linear Functionals Defined On It	CODEMA 2020, 2020
	3.	S.Brsakoska, A.Malcheski	Extension Of One Sided Branch 2-Subspace And Some Extensions Of Hahn - Banach Type For Skew-Symmetric 2- Linear Functionals Defined On It	CODEMA 2020, 2020
	4.			
	5.			
10.2.	Participation in scientific national and international projects (up to 5)			
	No.	Author	Title	Publisher/year
	1.		Methodology and Information Technologies in Education	Ministry for foreign affairs of Bulgaria, Ministry for foreign affairs of Russia, 2014-2025

	2.				
10.	Printed books in the last five years (up to 5)				
3.	No.	Author	Title	Publisher/year	
	1.	Slagjana Brskakoska, Aleksa Malchesk	Theory and applications of n-normed spaces	Ss. Cyril and Methodius University in Skopje, 2021	
	2.	Aleksa Malcheski	Theory and applications in n-normed spaces	Eliva press, 2022	
	3.	Risto Malcheski, Aleksa Malcheski, Samoilo Malcheski	Balkan Olympics in Mathematics 1984-2020	PMZ Armaganka Skopje, 2021	
	4.	Aleksa Malcheski	State competitions in mathematics in secondary schools	Armaganka, 2023	
	5.	Aleksa Malcheski	Regional competitions in mathematics in secondary education, 1978-2019	Armaganka, 2023	
10.	Printed professional papers in the last 5 years (up to 5)				
4.	No.	Author	Title	Publisher/year	
	1.	Aleksa Malcheski	Regressive induction	Armaganka, 2020	
11.	Supervision (mentorship) of undergraduate, master and doctoral studies students				
	11. 1.	Undergraduate	/		
	11. 2.	Master	1		
	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)	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 works and the title and area in which is named	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.	Engineering Mathematics	all on MFS	
	9.2.	List of courses that the teacher is lecturing in the second cycle			
		No.	Course	Study program/institution	
		1.	Probability and Statistics	all on MFS	
		2.	Complex Analysis for Engineers	all on MFS	
	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.	M. Obradovic, N. Tuneski	Certain properties of the class of univalent functions with real coefficients	Bulletin of the Korean Mathematical Society, 2023
		2.	M. Elin, F. Jacobzon, N. Tuneski	The Fekete-Szego problem and filtration of generators	Rendiconti del Circolo Matematico di Palermo II, 2023
		3.	M. Obradovic, N. Tuneski	Univalence of certain transform of univalent functions	Comptes rendus de l'Académie bulgare des Sciences, 2023

	4.	M. Obradovic, N. Tuneski	Coefficients of the inverse of functions for the subclass of the class $U(\lambda)$	The Journal of Analysis, 2022	
	5.	P. Zaprawa, M. Obradovic, N. Tuneski	Third Hankel determinant for the class of univalent starlike functions	Revista de la Real Academia de Ciencias Exactas, Físicas y Naturales. Serie A. Matemáticas, 2021	
	10. 2.	Participation in scientific national and international projects (up to 5)			
	No.	Author	Title	Publisher/year	
	1.	Nikola Tuneski (participant)	Teaching mathematics in STEM context for STEM students	Erasmus+ project, Key Action: Cooperation for innovation and the exchange of good practices, 2019- 2021	
	2.	Nikola Tuneski (participant)	"MATH4everyone"	Erasmus+ project, Key Action: Cooperation for innovation and the exchange of good practices, 2019- 2021	
	3.	Nikola Tuneski (participant)	Market Surveillance for Products which hold the GCTS in the GSO member states	Gulf Standardization Organization, 2020- 2021	
	10. 3.	Printed books in the last five years (up to 5)			
	No.	Author	Title	Publisher/year	
1.					
2.					
3.					
10. 4.	Printed professional papers in the last 5 years (up to 5)				
No.	Author	Title	Publisher/year		
1.					
11.	Supervision (mentorship) of undergraduate, master and doctoral studies students				
11. 1.	Undergraduate	/			
11. 2.	Master	1			
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.				
	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)	Bojan Prangoski		
2.	Date of birth	29.07.1984		
3.	Scientific degree/Title	VIII / PhD		
4.	Title of the scientific degree	PhD in mathematics		
5.	Year and institution of the scientific degree	Education	Year	Institution
		BSc in mathematics	2007	Faculty of Mathematics and Natural Sciences, Ss. Cyril and Methodius University in Skopje
		MSc in mathematics	2010	Faculty of Mathematics and Natural Sciences, Ss. Cyril and Methodius University in Skopje
		PhD in mathematics	2013	Faculty of Natural Sciences and Mathematics, University in Novi Sad, Serbia
6.	Area, field and particular specialty of master of science degree	Area	Field	Specialty
		Natural sciences and mathematics	Mathematics	Analysis and functional analysis
7.	Area, field and particular specialty of Doctoral degree	Area	Field	Specialty
		Natural sciences and mathematics	Mathematics	Analysis and functional analysis
8.	If employed, state the institution where he/she works and the title and area in which is named	Institution	Title and area	
		Faculty of Mechanical Engineering -Skopje, Ss. Cyril and Methodius University in Skopje	Associate Professor in 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.	Linear algebra and vector analysis	MVTM, PE, MPI / Faculty of Mechanical Engineering
		2.	Numerical methods	All four-year study programs on the Faculty of Mechanical Engineering
		3.	Object-oriented programming	IEM / Faculty of Mechanical Engineering
	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	SEE / Faculty of Mechanical Engineering
		2.	Selected topics in mathematics and informatics	IEM, AMST, TML, MV, TE, EE, AFE, MWSE, Mechatronics, SMMS / Faculty of Mechanical Engineering
		3.	MATLAB Programming	MSPDTP / Faculty of Mechanical Engineering
	9.3.	List of courses that the teacher is lecturing in the third cycle		
		No.	Course	Study program/Institution
10.	Selected results in the past five years			
	10.1.	Relevant printed scientific papers (up to 5)		
	1.	No.	Authors	Title
				Publisher/year
		1.	A. Debrouwere, B. Prangoski	Gabor frame characterizations of generalized modulation spaces, Anal. Appl. 21(3) (2023), 547-596.
		2.	P. Dimovski, B. Prangoski	Wiener amalgam spaces of quasianalytic ultradistributions, J. Math. Anal. Appl. 519(2) (2023), Article ID 126847
		3.	S. Pilipović, B. Prangoski	Characterisation of the Weyl-Hörmander classes by time-frequency shifts, Adv. Math. 410 (2022), Article ID 108742.
		4	S. Pilipović, B. Prangoski, Đ. Vučković	Extension of localisation operators to ultradistributional symbols with super-exponential growth, Rev. R. Acad. Cienc. Exactas Fis. Nat., Ser. A Mat., RACSAM 116(4) (2022), Paper No. 172.
		5.	S. Pilipović, B. Prangoski	Equivalence of ellipticity and the Fredholm property in the Weyl-Hörmander calculus, J. Inst. Math. Jussieu 21(4) (2022), 1363-1389.
	10.2.	Participation in scientific national and international projects (up to 5)		
		No.	Author	Title
				Publisher/year
		1.	Bojan Prangoski (national coordinator)	Microlocal analysis and application
				Bilateral scientific project between the Macedonian and Serbian academie

					s of sciences and arts, 2021-2023
10.3.	Printed books in the last five years (up to 5)				
	No.	Author	Title		Publisher/year
10.4.	Printed professional papers in the last 5 years (up to 5)				
	No.	Author	Title		Publisher/year
11.	Supervision (mentorship) of undergraduate, master and doctoral studies students				
11.1.	Undergraduate				
11.2.	Master				
11.3.	PhD				
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
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
12.3.	Proof of at least three participation in international meetings in the last four years				
	No.	Author	Title	Publisher/year	No.

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	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	2001	Faculty of Mechanical engineering - Skopje
		M. Sc. in Mechanical Engineering	1994	Faculty of Mechanical engineering - Skopje
		B. Sc. in Mechanical Engineering	1990	Faculty of Mechanical engineering - Skopje
6.	Area, field and particular specialty of master of science degree	Area	Field	Specialty
		Technical sciences	Mechanical engineering	Production Processes, technologies and systems
7.	Area, field and area of doctoral degree	Area	Field	Specialty
		Technical sciences	Mechanical engineering	Production Engineering, Technologies and Systems 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	
		Ss. Cyril and Methodius University in Skopje, Faculty of Mechanical Engineering - Skopje	Full time Professor, Production engineering, technologies and systems; Organization of technology processes	
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 innovation	IIM, IND / FME
		2.	Computer aided engineering	PI, MHT / FME
		3.	Production technologies	All study programmes / FME
		4.	Technology of rapid prototyping	PI / FME
		5.	Sustainable production	IIM, MHT / FME
	List of courses that the teacher is lecturing in the second cycle			

	9.2	No.	Course	Study program/institution	
		1.	Concurrent engineering	Advanced manufacturing systems and technologies / FME	
		2.	Modeling and simulation of injection porcess, tool and mold design	Advanced manufacturing systems and technologies / FME	
		3.	Technology of metalforming processes	Advanced manufacturing systems and technologies / FME	
		4.	Six Sigma	Industrial Engineering and Management, Product Lifecycle Management / FME	
		5.	Lean approaches	Industrial Engineering and Management / FME	
		6.	Circular economy	Industrial Engineering and Management / FME	
		7.	An Introduction to Eco-innovations	Sustainable energy and environment / FME	
	9.3	List of courses that the teacher is lecturing in the third cycle			
		No.	Course	Study program/institution	
1.		Management of Sustainable development	Industrial engineering and management / FME		
2.		Modeling and simulation of metalforming processes	Industrial engineering and management / FME		
		3.	Advanced computer aided technologies in production systems	Mechanical Engineering / FME	
		4.	Additive manufacturing	Mechanical Engineering / FME	
10.	Selected work in the past five years				
10.1.	Relevant scientific printed paper (up to 5)				
	No.	Author	Title	Publisher/year	
	1.	Fisnik Osmani, Atanas Kochov, Betim Shabani, Mirjeta Ilazi	The Importance of SD Goals Indicators 7, 8, 9 and 12 in the Industry Development by Using Multi Criteria and Decision Making Method	Technical Journal Vol. 14/No. 4; 2020, IF 2.1, DOI: 10.31803/tg-20200917084550 , Print: ISSN 1846-6168, 2020	
	2.	A.Kochov, A. Argilovski	Case Study: Six Sigma Project for Reducing Manual Handling of Materials in Real Manufacturing Company	Technical Journal Vol. 14/No. 4; 2020, IF 2.1, DOI: 10.31803/tg-20201002115534, Print: ISSN 1846-6168, December 2020	
	3.	S.Kjosevski, A. Kochov, D.Danev, A. Kostikj	Sustainable Transport Indicators in the Context of Introducing of Electric Passenger Cars	Technical Journal Vol. 14/No. 4; 2020, IF 2.1, DOI: 10.31803/t	

				g-20200706175206, Print: ISSN 1846-6168, September 2020
	4.			
	5.			
10.2.	Participation in scientific national and international projects (up to 5)			
	No.	Author	Title	Publisher/year
	1.	A.Kochov and Team of experts	Mapping economic, innovative and scientific potential in Macedonia	GIZ funded project: Project No. 16.2171.3-007.000, 2019-2020
	2.	A.Kochov and team from UDG, Montenegro	DIGagCOV- Digitalization and digital payment for SME's in Montenegro	Ministry of Science of Montenegro, 2020
	3.	A.Kochov and others	Physical 3D prototype for new product development for Rade Konchar TEP & SMELTING	Innovation voucher, Fund for innovation, Skopje, Macedonia 2020
10.3.	Printed books in the last five years (up to 5)			
	No.	Author	Title	Publisher/year
	1.	Fisnik Osmani, Atanas Kochov	Application of AHP Methodology for decision – making in Cleaner production	Nova Science Publishers, Series: Environmental Science, Engineering and Technology, 2022
10.4.	Printed professional papers in the last 5 years (up to 5)			
	No.	Author	Title	Publisher/year
	1.	Bojan Mitev, Atanas Kochov	Modeling and simulation of forging processes	International Scientific Conference Machines. Technologies. Materials 11-14.03.2020, Borovets, Bulgaria Proceedings Year III,

					Issue 1 (16), Borovets, Bulgaria 2020 Volume I Machines. Technologi es. Materials Issn 2535- 0021 (Print) pgs: 42-46
		2.			
		3.			
		4.			
		5.			
11.	Supervision (mentorship) of undergraduate, master and doctoral studies students				
11. 1.	Undergraduate			Over 20	
11. 2.	Master			Over 15	
11. 3.	Doctoral			7	
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)	Done Tashevski				
2.	Date of birth	04.08.1962				
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	2004	UKIM Skopje Macedonia Faculty of Mechanical Engineering		
		MSc Technical Sciences	1994	UKIM Skopje Macedonia Faculty of Mechanical Engineering		
		BSc Technical Sciences – Mechanical eng.	1985	UKIM Skopje Macedonia Faculty of Mechanical Engineering		
6.	Area, field and particular specialty of master of science degree	Area	Field	Specialty		
		Mechanical engineering	Energetic	Energy and ecology		
7.	Area, field and area of doctoral degree	Area	Field	Specialty		
		Mechanical engineering	Energetic	Fuel cells		
8.	If employed, state the institution where he/she works and the title and area in which is named	Institution		Title and area		
		Faculty of Mechanical Engineering Skopje, University Ss. Cyril and Methodius in Skopje		Professor / mechanical engineering-thermal 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.	Steam and gas turbines	TI/MFS		
		2.	Exploitation and maintenance of power plants and systems	TI/MFS		
		3.	Energy efficiency	EE/MFS		
		4.	Energy and ecology	EE/MFS		
	9.2.	List of courses that the teacher is lecturing in the second cycle				
		No.	Course	Study program/institution		
		1.	General ecology	EE/MFS		
		2.	Modeling of processes of energy conversion	TI/MFS		
	9.3.	List of courses that the teacher is lecturing in the third cycle				
		No.	Course	Study program/institution		
		1.	Energy efficiency	TI/MFS		
		2.	Modern power plants	TI/MFS		
	10.	Selected work in the past five years				
		10.1.	Relevant scientific printed paper (up to 5)			
No.			Author	Title	Publisher/year	

		1.	I. Shesho, Z. Markov, D. Tashevski, D. Dimitrovski	Possibilities for Improving Energy Efficiency in Industry Sector Utilising low Temperature Waste Heat Recovery	Journal of Environmental Protection and Ecology 19, No 3, 1431–1441, 2018. (JIF 0,734).
		2.	I. Shesho, R. Filkoski, D. Tashevski	Techno-economic and environmental optimization of heat supply systems in urban areas.	Thermal Science – International Scientific Journal, Vol. 22, Suppl. 5, Belgrade, Serbia, 2018. (JIF 0,35).
		3.	I. Shesho, R. Filkoski, D. Tashevski, M. Uler-Zefikj	Integration of large- scale heat pumps in the district heating system of Skopje	Proc. 15th International Conference on accomplishments in mechanical and industrial engineering, DEMI, Banja Luka, 2021.
		4.	I. Shesho, R. Filkoski, D. Tashevski, M. Uler-Zefikj	Optimal integration of solar assisted heating systems in residential buildings.	Journal Energija, ekonomija, ekologija, DOI: 10.46793/EEE21-4, (str. 31-37), 4, XXIII, 2021.
		5.	I. Shesho, M. Uler-Zefikj, R. Filkoski, D. Tashevski	The importance of district heating systems in periods of energy crisis: Case study for the city of Skopje.	Journal Energija, ekonomija, ekologija, DOI: 10.46793/EEE22- 2.40S, (str. 40-45) Republic of Serbia, 2022.
	10.2.	Participation in scientific national and international projects (up to 5)			
		No.	Author	Title	Publisher/year
		1.	D. Dimitrovski, D. Tashevski et al.	Safe Cross-Border Transportation of Hazardous Materials: Orphan Radioactive Sources STRASS	IPA Interreg, 2018 - 2021
		2.	I. Shesho, D. Tashevski	Techno-economic and environmental analysis of the potential for implementation of renewable energy sources in a central hot water heating system in an urban environment	Research project funded by MFS, Skopje, 2021
		3.	D. Dimitrovski, Z. Markov, V. Djinlev,	International scientific project Republic of Macedonia with	Ministry of Education and Science of the Republic of

			D. Tashevski	People's Republic of China 2017 – 2019, Modeling of pollution from public transport on air quality in urban environments, leader	Macedonia, 2017 - 2019
		4.	D. Tashevski et al	Enhancing ESM's (Power Plants of North Macedonia) role in North Macedonia's Just Transition.	Project funded by EBRD. Jun 2023 - now, PwC, North Macedonia.
	10.3.	Printed books in the last five years (up to 5)			
		No.	Author	Title	Publisher/year
		1.	S. Armenski, D. Tashevski	Thermal power plants – exercise, 300 p.,	Alfa 99 Skopje, ISBN 978-9998-936-36-4, Macedonia, 2010.
		2.	S. Armenski, D. Tashevski, L. Karakasheva	Production of briquets and pellets – handbook. 85 p.	CeProSARD, ISBN 978-608-65330-6-9, Skopje, Macedonia, 2012.
		3.	D. Tashevski	Maintenance and exploitation of energy power plants and systems (1 st publication), 298 p.,	UKIM in Skopje E-publication and digital libraries, Skopje, Macedonia, 2014 (No.03-187/2 from 11.2.2014).
		4.	D. Tashevski, I. Shesho, F. Zdraveski	Steam and Gas Turbines, Textbook (First Edition)	Decision on publishing textbook No. 02-215/1, 2021. GrafoProm Bitola/ 2023
		5.	D. Tashevski, I. Shesho, S. Armenski	Thermal Power Plants, Textbook (First Edition)	Decision to publish textbook No. 02-87/2, e-library UKIM, 2023
		6.	D. Tashevski, I. Shesho	Nuclear Power Plants, Textbook (First Edition)	Decision to publish textbook No. 02-86/2, e-library UKIM, 2023
	10.4.	Printed professional papers in the last 5 years (up to 5)			
		No.	Author	Title	Publisher/year
		1.	D. Tashevski	Technical report on the fire resistance calculations of a fire-resistant single-leaf door with a fixed glazed section "NG-1PPV-60", with a fire resistance of 60 minutes for DG Novogradba Skopje, No. 10-834/4	MFS Skopje / 2018
		2.	D. Tashevski, Mile Stankovski,	Expert finding and opinion on the technical and	MFS Skopje / 2018

			Darko Babunski, Emil Zaev, I. Shesho, Gorjan Nadzinski	technological justification of the investments made in fixed assets for heat energy production in 2016 from the aspect of safe, secure, continuous and high- quality heat energy production.	
		3.	D. Tashevski, R. Filkoski, I. Shesho	Study: Analysis of heat transfer between heated and unheated residential units.	UKIM in Skopje, Faculty of Mechanical Engineering Skopje for Heat Supply Balkan Energy DOOEL – Skopje, No. 10-134/1, 2018
		4.	D. Tashevski, R. Filkoski, I. Shesho	Study for assessing the remaining working life of WB boilers in ESM, subsidiary "Energetika" - Skopje	MFS Skopje / 2020
		5.	D. Tashevski	Technical report on the performed calculations of the insulation resistance to fire of a single-leaf revolving fire and security door "1PPV- 30, 90, 120" for the company for production, trade and services SEF company DOO, No. 10-265/4, 6, 8	MFS Skopje / 2021
11.	Supervision (mentorship) of undergraduate, master and doctoral studies students				
	11.1.	Undergraduate		52 mentorship of undergraduate students	
	11.2.	Master		9 mentorship of master students	
	11.3.	Doctoral		1 (2 students 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
	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
	12.3.	Proof of at least three international meetings' participation in the past four years			
		No.	Author	Title	International meeting/conf erence
					year

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)	Risto Filkoski		
2.	Date of birth	29.04.1964		
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
		BSc (Dipl. Eng.)	1989	UKIM, Faculty of Mech. Eng., Skopje
		MSc	1997	UKIM, Faculty of Mech. Eng., Skopje
		PhD	2004	UKIM, Faculty of Mech. Eng., Skopje
6.	Area, field and particular specialty of master of science degree	Area	Field	Specialty
		Technical sciences	Power engineering	Power and process engineering
7.	Area, field and area of doctoral degree	Area	Field	Specialty
		Technical sciences	Power engineering	Mathematical modelling and simulation of energy processes
8.	If employed, state the institution where he/she works and the title and area in which is named	Institution	Title	Scientific area
		Ss Cyril and Methodius University, Faculty of Mechanical Engineering	Professor	20500 Thermal power and process engineering; 20511 Technical thermodynamics
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 second cycle		
		No.	Course	Study program/institution
		1.	Thermodynamics	Energy and environment / FME
		2.	Boiler plants and energy conversion processes	Thermal and power engineering, Energy and environment / FME
		3.	Thermal analysis and CFD	Thermal and power engineering, Energy and environment / FME

		4.	Process technique	Thermal and power engineering, Energy and environment / FME		
		5.	Project - energy conversion processes	Thermal and power engineering, Energy and environment / FME		
	9.2.	List of courses that the teacher is lecturing in the second cycle				
		No.	Course	Study program/institution		
		1.	Advanced thermodynamics - selected chapters	Thermal and power engineering (TPE), Energy and environment (EE), Sustainable Energy and Environment (SEE) / FME		
		2.	Modelling and smulation of energy systems	TPE, EE / FME		
		3.	Energy conversion technologies	TPE, EE / FME		
		4.	Boiler plants - selected chapters	TPE, EE / FME		
		5.	Thermal processes and apparatus	TPE, EE / FME		
		6.	Energy planning and energy management	TPE, EE, AFE / FME		
		7.	Clean energy technologies	SEE / MΦC		
		8.				
	9.3.	List of courses that the teacher is lecturing in the third cycle				
		No.	Course	Study program/institution		
		1.	Modellling of energy conversion processes - selected chapters	Mechanical engineering / FME, UKIM		
		2.	Energy conversion processes and environmental impact	Mechanical engineering / FME, UKIM		
10.	Selected work in the past five years					
	10.1	Relevant scientific printed paper				
		No.	Author	Title	Publisher/year ar	
		1.	S. Domazetovska, V. Strezov, R.V.Filkoski,T. Kan	Exploring the Potential of Biomass Pyrolysis for Renewable and Sustaible Energy Production: A Comparative Study of Corn Cob, Vine Rod, and Sunflower	Sustainabilit y, MDPI, 2023, 15, 13552. https://doi.org/10.3390/su151813552	
		2.	B. Hoxha, A. Kuriqi, R.V. Filkoski	Influence of seasonal air density fluctuations on wind speed distribution in complex terrains in the context of energy yield	Springer, 2023, https://doi.org/10.1007/s40974-023-00301-9	

		3.	A. Gjasimovski, Ma. Sharevska, N.Gjasimovska, Mo. Sharevska, R.V. Filkoski	Thermal characteristics of combined compressor-ejector refrigeration/heat pump systems for HVAC&R	Thermal Science, 2023, https://thermalscience.vinca.rs/online-first/5552
		4.	F. Bunjaku, R.V.Filkoski	Optimisation of Thermal and Geometric Parameters of Cylindrical Fins during Natural Convection	Energies, MDPI, 2023, 16(4):1997, DOI: 10.3390/en16041997
		5.	Krasniqi Alidema D., Krasniqi M., Filkoski R.V., Krasniqi F.	Analysis of the Working Characteristics of the Ejector in the Water Heating System	Energies, MDPI, 2022, 15, 2025. https://doi.org/10.3390/en15062025
		6.	Hoxha B., Shesho I.K., Filkoski R.V.	Analysis of Wind Turbine Distances Using a Novel Techno-Spatial Approach in Complex Wind Farm Terrains	Sustainability, MDPI, 2022, 14, 13688, https://doi.org/10.3390/su142013688
	10.2	Participation in scientific national and international projects			
		No.	Author	Title	Publisher/year
		1.	Group of participants	Cyber-Physical systems and digital twins for the decarbonisation of energy-intensive industries (CYPHER), Prop. Ref. OC-2022-1- 26058	COST European Cooperation in Science and Technology, Funded by the Horizon 2020 FP of the EU, 2023-2025
		2.	Group of participants	Enhancing ESM's role in North Macedonia's Just Transition, Fin. by EBRD	PwC (lead institution), МФС/ЦИРКО, 2023- 2025
		3.	Filkoski R. V., Stanojevska Pecurovska B., Stojanovski F., Uler-Zefikj M.	Comparative analysis of energy effects and emissions when using conventional and alternative sources of energy in cement industry	Center for Climate Change and Cement Plant Usje, Skopje, 2021-2022
		4.	Sheso I., Filkoski R. V., Tashevski D. J., Uler-Zefikj M.	Techno-economic and environmental analysis of the potential for implementation of renewable energy sources in a	Ss Cyril and Methodius University, Faculty of Mechanical

				central heating system in an urban environment	Engineering , Skopje, 2019-2020
		5.	Tashevski D., Filkoski R. V., Shesho I.	Analysis of heat transfer between heated and non-heated residential units	Ss Cyril and Methodius Univesity, Faculty of Mechanical Engineering , Skopje, 2018
	10.3	Printed books in the last five years (up to 5)			
		No.	Author	Title	Publisher/year
		1.	R. V. Filkoski	Process technique (script)	Author, 2023
		2.	R. V. Filkoski	Energy conversion processes and technologies (script)	Author, 2023
		3.			
	10.4	Printed professional papers in the last 5 years (up to 5)			
		No.	Author	Title	Publisher/year
		1.	B. Bylykbashi, R. V. Filkoski,	Optimization of a pphotovoltaic system: a case study Kosovo	2023, International Journal of Innovative Science, Print ISSN: 1757-2223
		2.	Shesho I., Uler-Zefikj M., Filkoski R.V., Tashevski D.,	The importance of district heating systems in periods of energy crisis: Case study for the city of Skopje,	Energetika / Energetics 2022, Zlatibor, Serbia, 21 - 24 June 2022
		3.	I. K. Shesho, M. Uler-Zefikj, R. V. Filkoski, D. Tashevski,	The importance of district heating systems in periods of energy crisis: Case study for the city of Skopje,	Energija, ekonomija, ekologija, 2022, Year XXIV, No. 2, pp.40-45, doi: 10.46793/EE22-2.40S
		4.	I. Shesho, R. V. Filkoski, D. Tashevski, M. Uler-Zefikj	Optimal Integration of Solar Assisted Heating Systems in Residential Buildings	Energija, ekonomija, ekologija, 2021, Year XXIII, No. 4, pp.31-37, doi: 10.46793/EE21-4.31S

		5.	Filkoski R.V., Stojanovski F., Stanojevska Pecurovska B.,	Energy audit and energy efficiency of administrative and laboratory buildings, USJE Cement Plant TITAN	Center for Climate Change, Skopje, 2018-2019
		6.			
11.	Supervision (mentorship) of undergraduate, master and doctoral studies students				
	11.1	Undergraduate		Over 135	
	11.2	Master		10 completed and 4 in progress	
	11.3	Doctoral		7 completed, one 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			
		Ред. бр.	Автори	Наслов	Издавач / година
		1.	B. Hoxha, A. Kuriqi, R.V. Filkoski	Influence of seasonal air density fluctuations on wind speed distribution in complex terrains in the context of energy yield	Springer, 2023, https://doi.org/10.1007/s40974-023-00301-9
		2.	S. Domazetovska, V. Strezov, R.V.Filkoski,T. Kan	Exploring the Potential of Biomass Pyrolysis for Renewable and Sustainable Energy Production: A Comparative Study of Corn Cob, Vine Rod, and Sunflower	Sustainability, MDPI, 2023. 15, 13552. https://doi.org/10.3390/su151813552
		3.	F. Bunjaku, R.V.Filkoski	Optimisation of Thermal and Geometric Parameters of Cylindrical Fins during Natural Convection	Energies, 2023, 16(4):1997, DOI: 10.3390/en16041997
		4.	Hoxha B., Shesho I.K., Filkoski R.V.	Analysis of Wind Turbine Distances Using a Novel Techno-Spatial Approach in Complex Wind Farm Terrains	Sustainability, 2022, 14, 13688, https://doi.org/10.3390/su142013688
		5.	Filkoski R.V., Lazarevska A.M., Mladenovska D., Kitanovski D.	Steam system optimisation of an industrial heat and power plant	Thermal Science (The Int. J.), 2020, Vol. 24, No 6A, pp. 3649- 3662

		6.	Shesho I. K., Filkoski R. V., Tashevski D. J.	Techno-economic and environmental optimisation of heat supply systems in urban areas	Thermal Science, Vol. 22, Suppl. 5, 2018, pp. S1-S13	
		7.	Filkoski R. V., Petrovski I. J., Gjurchinovski Z.	Energy optimisation of vertical shaft kiln operation in the process of dolomite calcination	Thermal Science, Vol. 22, No. 5, 2018, pp. 2123-2135	
	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.	S. Domazetovska, V. Strezov, R.V.Filkoski,T. Kan	Exploring the Potential of Biomass Pyrolysis for Renewable and Sustaiaable Energy Production: A Comparative Study of Corn Cob, Vine Rod, and Sunflower	Sustainabilit y, MDPI, 2023. 15, 13552. https://doi.org/ 10.3390/su151813552	
		2.	Filkoski R.V., Lazarevska A.M., Mladenovska D., Kitanovski D.	Steam system optimisation of an industrial heat and power plant	Thermal Science (The Int. J.), 2020, Vol. 24, No 6A, pp. 3649- 3662	
12.3	Proof of at least three international meetings' participation in the past four years					
	Реден број	Автори	Наслов на трудот	Меѓународ ен собир/ конференц ија	Год ина	
		1.	Monika Uler-Zefikj, Igor Shesho, Risto V. Filkoski, Done Tashevski, Dame Dimitrovski	General Overview of the Operation, Efficiency and Emissions of Waste- to-Energy Technologies	20th Int. Conf. on Thermal Science and Engineering SIMTERM 2022, Nis	
		2.	Hoxha B., Filkoski R.V.	Role of wind energy in sustainable development in coal-based systems: case of Kosovo, (Paper: ID-110)	10th European Conference on Renewable Energy Systems (ECRES 2022), Istanbul	

		3.	Bylykbashi Blerina, Filkoski Risto V.	Comparative Performance Analysis of Conventional and Thin-Film PV Panels for Kosovo Conditions	9 th Global Conference on Global Warming (GCGW- 2021), Zagreb	Aug ust 1-4, 202 1
		4.	Risto V. Filkoski, Petar Sabev Varbanov, Hrvoje Mikulčić	Second Law Efficiency Assessment of a Vertical Kiln for Refractory Material Manufacturing,	Proc. of the 24 th Conf. on Process Integration, Modelling and Optimisation for Energy Saving and Pollution Reduction (PRES24), Brno, Czech Republic	31 Oct. – 3 Nov. , 202 1
		5.	Filkoski R.V.	Exergy-based assessment of shaft kiln efficiency	6th Int. Conference on Contempora ry Problems of Thermal Engineering CPOTE 2020, Krakow	21- 24 Sept emb er 202 0

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)	Ana Lazarevska		
2.	Date of birth	11.12.1969		
3.	Scientific degree / Title	D. Sc.		
4.	Title of the scientific degree	D. Sc. in Technical Science		
5.	Year and institution of the scientific degree	Education	Year	Institution
		Ph.d In Engineering	2008	Faculty of Mechanical engineering - Skopje
		M. Sc. In Engineering	2001	Faculty of Mechanical engineering - Skopje
		B. Sc. In Engineering	1994	Faculty of Mechanical engineering - Skopje
6.	Area, field and particular specialty of master of science degree	Area	Field	Specialty
		Technical-sciences	Mechanical	Fluid mechanics Environmental protection
7.	Area, field and area of doctoral degree	Area	Field	Specialty
		Technical-sciences	Mechanical	Environmental protection
8.	If employed, state the institution where he/she works and the title and area in which is named	Institution	Title and area	
		University of Ss Cyril and Methodius in Skopje, Faculty of Mechanical Engineering	Full professor, Environmental protection, Energy	
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		
		Nr.	Course	Study program/institution
		1.	Introduction in Mechanical Engineering	All study programmes
		2.	Introduction in Sustainable Development	HEI, EE, IND / FME, UKIM
		3.	Standards and regulatory framework for hydropower systems	HEI / FME, UKIM
		4.	Energy Management Systems	HEI / FME, UKIM
		5.	Energy and Power Basics	HEI, TML, TI / FME, UKIM
		6.	Fluid Conveying Systems (Fluid transport)	HEI / FME, UKIM
		7.	Practice	HEI, EE / FME, UKIM
	8.	Project	HEI, EE / FME, UKIM	
	9.2.	List of courses that the teacher is lecturing in the second cycle		
		Nr.	Course	Study program/institution
		1.	Energy vs. Sustainable Development: Concepts and Aspects (мкд. Енергијата наспроти одржливиот развој)	SEE, EE, HEI / FME, UKIM
		2.	Modeling and Simulations of Energy Systems	SEE / FME, UKIM
	9.3.	List of courses that the teacher is lecturing in the third cycle		

		Nr.	Course	Study program/institution
		1.	Sustainable Development and Corporate Social Responsibility	Generic, Mechanical Engineering / UKIM
		2.	Computer-aided experimentation (CAX) with numerical and physical models of engineering processes	Generic, Mechanical Engineering / UKIM
		3.	Energy towards a Sustainable Society	Mechanical Engineering / UKIM
		4.	Identification and management of environmental risks	Mechanical Engineering / UKIM
		5.	Dynamics of objects and processes	Mechanical Engineering / UKIM
10.	Selected work in the past five years			
10.1.	Relevant scientific printed paper (up to 5)			
	Nr.	Author	Title	Publisher/year
	1.	Selim I., Lazarevska A. M., Kandikjan T., Sidorenko S.,	Material identification e-platform for environmentally friendly products	Conf. proc. DRS Learn Design 2019, Middle East Technical University, Ankara, Turkey, 9-12 July 2019, (Conf. Proc. https://drive.google.com/open?id=1hP_zm-o4Pm3tqOS2RKZPgFd0CQ_CzlpY and BoA https://blog.metu.edu.tr/drs/xd19/files/2019/07/DRSLXD_2019_ABSTRACTS.pdf)
	2.	Mitevaska M., Mladenovska D., Celakoska C., Lazarevska A.M.	Is transition towards a sustainable electro-energetic system (EES) in n. Macedonia possible till 2021 through implementing economic reform policies?	11th Intl. Conf. Proc. (2019; Prilep) Digital transformation of the economy and society : shaping the future, 19-20 October, 2019 Prilep. - Prilep : Faculty of economy, 2019. pp. 218-228 (http://eccfp.edu.mk/tabs/view/ef30304a27af379fa58d10b9ec354f4d , http://eccfp.edu.mk/files/bil tens/Proceedings_2019)
	3.	Mladenovska D., Lazarevska A. M.	Identifying relevant indicators for cost-effective maintenance in coal-fired thermal power plants	Conf. proc. Transport and Logistics (TIL) 2019, Nish, Serbia, 6 Dec, 2019, pp. 161-166 (http://til.masfak.ni.ac.rs/images/til-pedja/Proceedings_til2019-1.pdf)
	4.	Yigit F., Lazarevska A. M., Dinc G., Kochubovski M.	Risk assessment Environmental and Energy Aspects in Meat Industry Risk Assessment via Fuzzy Clustering	Journal of Environmental Protection and Ecology (JEPE), 24 (2), 408–415 (https://scibulcom.net/article/uDXnvn2QCIAD9f6F6bEh)
	5.	Kormushoski, A., Lazarevska, A. M., Gecevska V.	Needs Assessment of Ambient CO2 Monitoring Solution	Mechanical Engineering – Scientific Journal, Vol. 42, No. 1, pp. 53–60 (2024). (https://www.mesj.ukim.edu)

				u.mk/journals/article/view/119
10.2.	Participation in scientific national and international projects (up to 5)			
	Nr.	Author	Title	Publisher/year
	1.	UNIDO, Regional Environmental Center – CO Macedonia	GEF-UNIDO EnMS CBI: "GEF-UNIDO Energy Management Systems (EnMS) Capacity Building and Implementation (CBI) Programme"	Regional Environmental Center (REC), Office in Macedonia, funded by Global Environmental Facility (GEF) – UNIDO (http://www.rec.org) (2015 – 2022)
	2.	Project Leader E. Zaev	Introducing a Cooperative Training Program (i.e. VET): Automation of Hydraulic and Pneumatic Systems in Industry (Industry 4.0)	Regional Cooperation Fund (RCF) funded project, implemented by FME, (2022 – ongoing)
	3.	MACEF	Provision of an Assessment of Climate Technologies potential in industry in the Republic of North Macedonia, (Rfx No. 700000)	funded by UNIDO (2022 – 2023)
	4.	DAAD, Project Leader Klinge, Sandra	DAAD "Advanced Numerical Methods for Engineering Tasks" has been accepted.	DAAD (2024 – 2025)
	5.	UN CEET, Working Group 5	UN Council of Engineers for Energy Transition	UN CEET, UNEP (2023 –)
10.3.	Printed books in the last five years (up to 5)			
	Nr.	Author	Title	Publisher/year
	1.			
	2.			
	3.			
	4.			
	5.			
10.4.	Printed professional papers in the last 5 years (up to 5)			
	Nr.	Author	Title	Publisher/year
	1.	Kitanovski D., Lazarevska A.M., Mladenovska D., Filkoski, R.V.	Steam System Optimization of an Industrial Heat and Power Generation Facility	Conf. Proc. SDEWES 2019 (electronic version) (https://www.dubrovnik2019.sdewes.org/)
	2.	Тасевски В., Кицара Џ., Лазаревска А.М.	Придобивки од примената на стандарди од областа на туризмот во С. Македонија“ (Eng. Benefits from applying Standards in the field of	Proc. Third International Scientific Conference “Challenges of Tourism and Business Logistics in the 21st Century” , 13.11.2020, Штип, Р. Македонија, 2020

				Tourism in the R. N. Macedonia),	
		3.	Kormushoski, A., Lazarevska, A. M., Gecevska V.	Needs Assessment of Ambient CO2 Monitoring Solution	Mechanical Engineering – Scientific Journal, Vol. 42, No. 1, pp. 53–60 (2024). (https://www.mesj.ukim.edu.mk/journals/article/view/119)
		4.	Mladenovska, D., Selim, I., Lazarevska, A. M., & Kandikjan, T.	Attributes Defining Cost-Effectiveness of Biodegradable Products in the Product Driven Design (PDD).	Mladenovska, D., Selim, I., Lazarevska, A. M., & Kandikjan, T.,: Journal of Environmental Protection and Ecology (JEPE), 24 (1), pp. 374–381, (2023) (https://scibulcom.net/en/article/6sRvpW62Vn5YSL3KDW7Y).
11.	Supervision (mentorship) of undergraduate, master and doctoral studies students				
	11. 1.	Undergraduate		2	
	11. 2.	Master		1	
	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			
		Nr.	Author	Title	Publisher/year
		1.	Selim I., Lazarevska A.M., Mladenovska D., Kandikjan T., Sidorenko S.	Identifying Material Attributes for Designing Biodegradable Products.	In: Karabegović I. (eds) New Technologies, Development and Application II. NT 2019. Lecture Notes in Networks and Systems, vol 76 (LNNS 76). Springer, Cham, pp. 633–639. (2020) https://doi.org/10.1007/978-3-030-18072-0_74
		2.	Selim I., Lazarevska A. M., Kandikjan T., Sidorenko S.,	Material identification e-platform for environmentally friendly products	Conf. proc. DRS X Learn Design 2019, Middle East Technical University, Ankara, Turkey, 9-12 July 2019, (Conf. Proc. https://drive.google.com/open?id=1hP_zm-o4Pm3tgOS2RKZPgFd0CQ_CzlpY and BoA https://blog.metu.edu.tr/drs/xd19/files/2019/07/DRSLXD_2019_ABSTRACTS.pdf)
		3.	Mladenovska D., Lazarevska A. M.	Socio-economic Indicators Influence in Terms of Natural Gas Supply Policy and Decision Making - Macedonian Case.	TEM Journal, 8(1), 132-143. 2019, (http://www.temjournal.com/ , http://www.temjournal.com/content/81/TEMJournalFebruary2019_132_143.pdf)
		4.	Mladenovska , D., Selim, I.,	Attributes Defining Cost-Effectiveness of	Mladenovska, D., Selim, I., Lazarevska, A. M., &

		Lazarevska, A. M., & Kandikjan, T.	Biodegradable Products in the Product Driven Design (PDD).	Kandikjan, T.: Journal of Environmental Protection and Ecology (JEPE), 24 (1), pp. 374–381, (2023) (https://scibulcom.net/en/article/6sRvpW62Vn5YSL3KDW7Y).	
	5.	Yigit F., Lazarevska A. M., Dinc G., Kochubovski M.	Risk assessment Environmental and Energy Aspects in Meat Industry Risk Assessment via Fuzzy Clustering	Journal of Environmental Protection and Ecology (JEPE), 24 (2), 408–415 (2023) (https://scibulcom.net/article/uDXnvn2QCIAD9f6F6bEh)	
	6.	Kormushoski, A., Lazarevska, A. M., Gecevska V.	Needs Assessment of Ambient CO2 Monitoring Solution	Mechanical Engineering – Scientific Journal, Vol. 42, No. 1, pp. 53–60 (2024). (https://www.mesj.ukim.edu.mk/journal/s/article/view/119)	
12.	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				
2.	Nr.	Author	Title	Publisher/year	
	1.	Celakoska E., Lazarevska A M.	“Conditions on Nonlinearity of Oscillatory Equations Inducing the Periapsidal Precession”	General Relativity and Gravitation (2019) 51:67 https://doi.org/10.1007/s10714-019-2550-1 . 2019© Springer Science+Business Media, LLC, part of Springer Nature 2019 (IF 1.515) (https://www.springer.com/journal/10714)	
	2.	Filkoski, R. V., Lazarevska, A.M., Mladenovska , D., Kitanovski, D.	Steam System Optimization of an Industrial Heat and Power Plant	Thermal Science: 2020, Vol. 24, No. 6A, pp. 3649-3662 (http://www.doiserbia.nb.rs/Article.aspx?id=0354-98362000284F#X75qgs1KhPZ , http://www.doiserbia.nb.rs/img/doi/0354-9836/2020/0354-98362000284F.pdf) (IF 1.574 (2019))	
12.	Proof of at least three international meetings' participation in the past four years				
3.	Nr.	Author	Title	International meeting/conference	year
	1.	Mladenovska D., Lazarevska A.M., Krstanoski M.	Attributes relevant for sustainable additive manufacturing – material driven approach,	World Symposium on Mechanical-Materials Engineering & Science (WMMES 2021): IOP Conf. Series: Materials Science and Engineering 1190 (2021) 012001 IOP Publishing doi:10.1088/1757-899X/1190/1/012001	2010

		2.	Bukovetz J., Yiğit F., Lazarevska A. M., Jokić N., Kochubovski M.	Environmental Fuzzy Risk Assessment from Phthalates in Menstrual Pads	5th Euro- Mediterranean Conference for Environmental Integration, 2-5th Oct 2023, Rende (Consenza), Italy	2010
		3.	Yiğit F., Lazarevska A. M.	Optimization of Production Planning using Fuzzy Analytic Hierarchy Process with Sequence Dependent Setup Times	International Scientific Conference on Green Development, Infrastructure, Technology (GREDIT) 2024, Skopje 16-18 May 2024	2013
		4	Zdravkovska I, Ilikj A., Lazarevska A. M. (mentor)	Macedonian Green Agenda Commitments and Challenges with aa Focus on Climate Action (in Macedonian Македонските заложи и предизвици во контекст на Зелената Агенда со фокус на климатска акција)	Proc 12 th Student Conference on Energy Efficiency and Sustainable Development (SCEESD) (29 Oct – 1 Nov, 2024) (accepted to be published in the conf. proceedings) (https://skeeor.feit.ukim.edu.mk/?lang=en)	2024
		5	Kormushoski A., Kalendar M., Lazarevska A.M., Gecevska V.	Ambient CO2 and Temperature IoT Monitoring Solution	Proc 16th International Conference ETAI 2024 (21-23 Sep, 2024, Struga, R. Macedonia) (accepted to be published in the conf proceedings) (https://etai.org.mk/?page_id=452)	2024
		6	Kormushoski, A., Lazarevska, A. M., Gecevska V.	Monitoring device for ambient CO2: Needs Assessment and Needs Analysis,	International Scientific Conference on Green Development, Infrastructure, Technology (GREDIT) 2024, Skopje 16-18 May 2024	2024

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 Markov		
2.	Date of birth	23.06.1975		
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	2007	Faculty of Mechanical engineering - Skopje
		M. Sc. in Mechanical Engineering	2001	Faculty of Mechanical engineering - Skopje
		B. Sc. in Mechanical Engineering	1998	Faculty of Mechanical engineering - Skopje
6.	Area, field and particular specialty of master of science degree	Area	Field	Specialty
		Technical-technological sciences	Mechanical	Fluid mechanic and fluid flow systems
7.	Area, field and area of doctoral degree	Area	Field	Specialty
		Technical-technological sciences	Mechanical	Hydro energy
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, Faculty of Mechanical engineering	Professor, Fluid flow and hydraulic machinery	
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.	Fluid mechanics	EE, TI, TML, MV/ FME
		2.	Hydraulic turbines and pumps	AFI / FME
		3.	Hydropower plant	EE / FME
	9.2.	List of courses that the teacher is lecturing in the second cycle		
		No.	Course	Study program/institution
		1.	Theory of turbine and CFD simulation	AFI / FME
		2.	Selected chapters of Fluid Mechanics	AFI / FME
		3.	Waste water treatment	EE / FME
9.3.	List of courses that the teacher is lecturing in the third cycle			
	No.	Course	Study program/institution	
	1.	Transformation of renewable energy in hydraulic machines	Mechanics / FME	

	2.	Hydro energy and environment	Mechanics / FME	
10.	Selected work in the past five years			
10.	Relevant scientific printed paper (up to 5)			
1.	No.	Author	Title	Publisher/ year
	1.	Lazarevikj, M., Markov, Z.	Automated hydraulic design procedure for a Francis turbine spiral casing, Proceedings of the 31st Symposium on hydraulic machinery and systems	IOP Conf. Series: Earth and Environm ental Science 1079 (2022) 012009, doi:10.10 88/1755- 1315/107 9/1/01200 9
	2.	Stojkovski F., Lazarevikj M., Markov Z., Iliev I., Dahlhaug OG	Constraints of Parametrically Defined Guide Vanes for a High-Head	Energies 2021, Volume 14, Issue 9, 2667, https://doi.org/10.3390/en14092667 , SCI=3,00 4, Citescore Scopus=4 ,7
	3.	Trivedi C, Iliev I, Dahlhaug OG, Markov Z, Engstrom F, Lysaker H	Investigation of a Francis turbine during speed variation: Inception of cavitation	Renewabl e Energy 166 (2020) pp. 147- 162, https://doi.org/10.1016/j.renene.2020.11108 , SCI=8,00 1; Citescore Scopus=1 0,8
	4.	Lazarevikj, M., Stojkovski, F., Markov,	Parameter based tool for Francis turbine guide vanes design using coupled MATLAB - ANSYS approach	J.sustain. dev. energy

		Z., Iliev, I., Dahlhaug, O. G.		water environ. syst., Year 2022, Volume 10, Issue 3, 1090410, DOI: https://doi.org/10.13044/j.sdes.d9.0410 , SCI=0,384 , Citescore Scopus=3,7
	5.	Stojkovski, F., Markov, Z.	Non-uniform Design of Guide Vanes for Variable Speed Francis Turbines	Proceedings 39th IAHR World Congress, 19 June 2022, Granada, Spain doi://10.3850/39WC25217-22836, https://www.iahr.org/library/information/204
10. 2.	Participation in scientific national and international projects (up to 5)			
	No.	Author	Title	Publisher/ year
	1.	Markov Z. et al.	Hydroflex	Horizon 2020 research project, 2018-2022
	2.	Markov Z. et al.	Building Knowledge and Experience Exchange in CFD	CEEPUS Network CIII-RS-1012-03-1718, 2017-2024
	3.	Doujak E., Markov Z. et al.	Pan-European Network for Sustainable Hydropower (PEN@Hydropower)	COST Action CA21104, 2022-2026

	4.	Iliev V., Markov Z. et al.	Numerical and Experimental Investigations of the Aerodynamic Characteristics of a Model Race Car	Ss. Cyril and Methodius University Research Funded Project, 2022
	5.	Markov Z. et al.	Smart LightwAve Multi-modal Distributed Acoustic Strain and Temperature sensor (SLAM-DAST)	Horizon 2020 Grant project ID: 971149, 2021-23
10.3.	Printed books in the last five years (up to 5)			
	No.	Author	Title	Publisher/year
	1.	Markov Z., Babunski D. et al.	Water management of Cross-border waterbodies	Konrad-Adenauer-Stiftung and Wilfried Martens Center-Brussels, 2020
10.4.	Printed professional papers in the last 5 years (up to 5)			
	No.	Author	Title	Publisher/year
	1.	Buckovski A., Markov Z., Iliev V., Babunski D.	Use of Reinforcement Learning in the Modelling of Ring-Type Water Networks	Proceedings of 12 th Mediterranean Conference on Embedded Computing (MECO), pp.398-401, June 2023, Budva, Montenegro.
	2.	Babunski D., Lazarevikj M., Zaev E., Markov Z.	Direct Tool for Generation of the Geometry of a Francis Turbine Guide Vane System	Conference Proceedings, pp. 681-684, 2020 9th Mediterranean Conference Embedded Computing

					g (MECO), 8-11 June 2020, Budva, Monteneg ro 10.1109/ MECO49 872.2020. 9134214
		3.	Nikolova Poceva S., Chaushevski A., Stojkovski V., Markov Z.	Hydropower plants operating modes in a cascade system depending on the needs of the power system	XXXV Internatio nal Symposiu m "Energeti ka 2020", Conferen ce proceedin gs, pp. 478-484, Zlatibor, Serbia, 24-27. June 2020., ISSN 0354- 8651 (held online)
		4.	Jovanoski I., Markov Z., Tuneski A., Babunski D.	Energy efficiency improvement through modification of active sludge treatment process with the small size wastewater treatment plants	Cemepe and Secotox Conferen ce 2019, Mykonos, Greece, June 2019
11.	Supervision (mentorship) of undergraduate, master and doctoral studies students				
	11.1.	Undergraduate		45	
	11.2.	Master		8	
	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.			
	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.	Proof of at least three international meetings' participation in the past four years				
	3.	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)	Dame Dimitrovski			
2.	Date of birth	21.11.1979			
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.	2010	UKIM, Faculty of Mechanical engineering	
		Magister of technical sciences	2007	UKIM, Faculty of Mechanical engineering	
		Mechanical engineer	2003	UKIM, Faculty of Mechanical engineering	
6.	Area, field and particular specialty of master of science degree	Area	Field	Specialty	
		Energetic, Mechanical engineering	Thermoenergy	IC engines and environment	
7.	Area, field and area of doctoral degree	Area	Field	Specialty	
		Energetic, Mechanical engineering	Thermoenergy	IC engines and environment	
8.	If employed, state the institution where he/she works and the title and area in which is named	Institution	Title and area		
		University of St. Cyril and Methodius in Skopje, Faculty of Mechanical engineering	Associate professor, Thermotechnics and Thermoenergetics		
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.	IC engines	TEI, MV / MFS		
	2.	Engines and ecology	EE / MFS		
	3.	Waste management	TEI, EE, IND / MFS		
	4.	Design and tuning of IC engines	TEI / MFS		
	9.2.	List of courses that the teacher is lecturing in the second cycle			
		No.	Course	Study program/institution	
		1.	Transport and the environment	SEE, EE, MV / MFS	
		2.	Eco-engines, Internal combustion engines – advanced level 1	SEE, TEI / MFS	
3.		Modeling and simulation of energy processes and systems	EE / MFS		
4.		Waste management – advanced level 1	TEI / MFS		
5.	Processes of energy conversion	TEI / MFS			

		6.	Influence of the energy processes on the environment	EE / MFS	
	9.3.	List of courses that the teacher is lecturing in the third cycle			
		No.	Course	Study program/institution	
		1.	Internal combustion engines – advanced engineering methods for their improvement	Mechanical engineering / MFS	
		2.	Waste management – sustainable systems	Mechanical engineering / MFS	
10.	Selected work in the past five years				
	10.1	Relevant scientific printed paper (up to 5)			
		No.	Author	Title	Publisher/year
		1.	Zoran Sapuric*, Filip Ivanovski, Dame Dimitrovski	Challenges of waste management in city of Skopje	Int. journal of ecosystems and ecology science ISSN 2224-4980. (IJEES) Vol. 7/4, 2017, pp.743-748
		2.	D. Dimitrovski, V. Djinlev	Calculating PM and NOX emissions from public transportation: The Case of Skopje,	Journal of environmental protection and ecology 17, No.3, 851-856, 2016
		3.	D. Dimitrovski, D. Stojevski	Lifecycle costs comparison between district heating and air inverters	Journal of Environmental Protection and Ecology 20, No 3, 2019, 1076–1082
		4.	D. Dimitrovski *, V. Dimitrov	Air pollution emissions from heavy freight vehicles	Journal of Environmental Protection and Ecology 20, No 4, 2019, 1611–1616
		5.	D. Dimitrovski, V. Dimitrov, M. Dimitrovski, Wang Bo, Hu Danjuan,	Analysis of emissiona from diesel passenger cars in North Macedonia	Int. Journal of Ecosystems and Ecology

				Science (IJEES), Vol. 9/1, 2019, pp. 245-250
10.2	Participation in scientific national and international projects (up to 5)			
	No.	Author	Title	Publisher/year
	1.	Z.Markov, D. Dimitrovski, et al.	HERD-Quality Improvement of Master Studies in Energy and Environment (QIMSEE)	Министерство за надворешни работи на Кралството Норвешка, 2014-2017
	2.	Д. Димитровски, З. Марков, В. Џинлев. Д. Ташевски	Меѓународен научен проект Република Македонија со Народна Република Кина 2017 – 2019, Моделирање на загадувањето од јавниот превоз врз квалитетот на воздухот во урбани средини, раководител	Министерство за образование и наука на Република Македонија, 2017 - 2019
	3.	D. Dimitrovski et al.	Safe Cross-Border Transportation of Hazardous Materials: Orphan Radioactive Sources STRASS	IPA Interreg, 2018 - 2021
	4.	H. Spasevska, D. Dimitrovski...	HORIZON 2020, TRAINEE, Macedonian Engineering Association, Chamber of Commerce of Macedonia	HORIZON 2020, 2019 - 2021
	5.	D. Dimitrovski et al.	Virtual vehicle - COMET K2 DIGITAL MOBILITY	COMET Competence Centers for Excellent Technologies from the Austrian Federal Ministry for Climate Action, the Austrian Federal Ministry for Digital and Economic Affairs, 2019 - 2026
	Printed books in the last five years (up to 5)			

10.3	No.	Author	Title	Publisher/year
	1.	Mile Dimitrovski Dame Dimitrovski	Publication: Agro Energy study possibilities for the use of renewable energy sources in rural areas in the country	Study Agro, Energy Study nr. 008/2009 – Biogas 2009
	2.	Dame Dimitrovski	Monograph: Reducing air pollution in Skopje by replacing existing fossil fuels with natural gas, a candidate for the award Gotse Delchev 2008, Skopje, ISBN 978-9989-9812-8-9	2008, Institute of gaseous technique, Ministry of education and science of the Republic of Macedonia
	10.4 Printed professional papers in the last 5 years (up to 5)			
	No.	Author	Title	Publisher/year
	1.	Dame M. Dimitrovski	Awarded labor original research results published in scientific reference / professional journal with an international editorial board: Ecological benefits of NG buses in Skopje, Awarded article	International Gas conference, Beograd, Serbia, 2007
	2.	Z. Markov, D.Dimitrovski, V.Aleksic	Development of Gas Distribution Network for the city of Kumanovo – Challenges and Solutions, International Gas Conference of South Eastern Europe	Proceedings of the Institute of Gas Technology
10.4	3.	D. Dimitrovski, M. Stojanovski, D. Stojanovska	Virtual pipelines – short cut to natural gas utilization, International Gas Conference of South Eastern Europe	International Gas Conference, Sarajevo 2012
	4.	Dame Dimitrovski	Why biogas from agriculture and livestock, haven't become the basis for rural development in Macedonia	Zemak, Ohrid, 2010
	5.	Done Tashevski, Dame Dimitrovski	Optimization of binary co-generative thermal power plants with SOFC on solid fuel	JETP
11.	Supervision (mentorship) of undergraduate, master and doctoral studies students			
11.1	Undergraduate		27	
11.2	Master		5	
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.	Gordana Popsimonova, Biljana Ristovska, Dame Dimitrovski (CA), Goce Georgievski	Greenhouse production in Macedonia – challenges and opportunities	MESJ 77–84, UDC 621, CODEN: MINS5, ISSN 1857 – 5293
		2.	Dame Dimitrovski, Blagojce Bogatinovski	Review of printed scientific paper in Mechanical engineering up to date MESJ, review	Mechanical engineering –Scientific journal vol.30, 2012
		3.	Dame Dimitrovski, Goran Dimeski	Possibilities for pollution reduction from households by implementing natural gas	Mechanical engineering –Scientific journal vol 32-1, 2014
		4.	Dame Dimitrovski, Mile Dimitrovski, Elena Kitanovska, Done Tashevski	Pollution from diesel engine with emphasis on pollution in Macedonia	Mechanical engineering –Scientific journal vol 32-1, 2014
	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.	Z. MARKOV, D. DIMITROVSKI, I. JOVANOSKI, A. NENCHEV.	Production and Utilising of Biogas and Other Measures for Increasing Energy Efficiency in the Municipal Wastewater Treatment Plant p.1014	Journal of environmental protection and ecology, 2013, vol.3
		2.	M. DIMITROVSKI, Z. SAPURIC, D. DIMITROVSKI CA, M. KOCHUBOVSKI.	European Union Regulations of Road Transport Air Pollution and Its Implementation in the FYR Macedonia p.813	Journal of environmental protection and ecology, 2013, vol.3A
		3	Done Tashevski, Dame Dimitrovski	Optimization of binary co-generative thermal power plants with SOFC on solid fuel	Chemical Engineering Transactions, Journal ISSN: 19749791
		4	D. Tashevski, R. Filkoski, D. Dimitrovski, I. Shesho	Analysis of Parameters Affecting the Efficiency Optimization of Binary SOFC Co-generation Power Plants.	International Journal of Mechanical Engineering and Technology (IJMET), (ISSN

					0976–6359 Online), Volume 5, Issue 10, pp. 180-190, India, 2014 (JIF 7,5377)
	5	Dame Dimitrovski, Mile Dimitrovski, Antonio Jovanovski	Model for calculation of NOx from public transport in the city of Skopje		JEPE, 2014, accepted for publishing, vol 4
12.3	Proof of at least three international meetings' participation in the past four years				
	No.	Author	Title	International meeting/conf erence	year
	1.	D. Dimitrovski, M. Dimitrovski, E. Kitanovska, D. Tashevski:	Pollution from Diesel Engines do to Increase of Imported Vehicles in FYR-Macedonia. (IOC - 2 nd Award)	1 st International Medical Conference "Environment and Public Health" MED ENV 2014, Mamaia, Romania,	12-14 September 2014.
	2.	D. Dimitrovski, M. Dimitrovski, G. Popsimonov a, D. Tashevski	Biogas – Overview of the Possibilities for Implementation in the Macedonian Agricultural Sector. (IOC)	16 th Symposium on Thermal Science and Engineering of Serbia – SIMTERM 2013, p. 11, Sokobanja, Serbia,	22-25 October, 2013.
		D. Dimitrovski, K. Belcheska, D. Tashevski, M. Kocubovsk	Possible Scenarios for Achiving the Goal 20/20/20 in FYR-Macedonia.	1 st Internatinal U.O.C. – B.E.N.A. – Conference "The Sustainability of Pharmaceutical, Medical and Ecological Education and Research – SPHAMEER – 2013", p. 6, Constanca,	20-23 June, 2013.

					Romania. (IOC)	
			D. Tashevski, D. Dimitrovski, Z. Markov, I. Shesho:	Energy and Ecology Benefits of Independent SOFC/Gas Turbine Co-generation Power Plant on Natural Gas.	1 st Internatinal U.O.C. – B.E.N.A. – Conference “The Sustainability of Pharmaceutic al, Medical and Ecological Education and Research – SPHAMEER – 2013”, p. 6, Constanca, Romania,	20-23 June, 2013. (IOC)
			D. Dimitrovski, M. Dimevska, D. Tashevski:	Strategic connection of Republic of Macedonia to the European natural gas streams. (IOC)	International gas conference of South Eastern Europe, Sarajevo, Bosnia and Herzegovina,	2012

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)	Darko Babunski			
2.	Date of birth	04.10.1975			
3.	Scientific degree / Title	Ph.D./Full Professor			
4.	Title of the scientific degree	Ph.D. in Technical Sciences			
5.	Year and institution of the scientific degree	Education	Year	Institution	
		Ph.D	2012	Faculty of Mechanical Engineering - Skopje	
		M.Sc	2006	Faculty of Mechanical Engineering - Skopje	
		B.Sc	1999	Faculty of Mechanical Engineering - Skopje	
6.	Area, field and particular specialty of master of science degree	Area	Field	Specialty	
		Technical Sciences	Mechanical Engineering	Control Systems	
7.	Area, field and area of doctoral degree	Area	Field	Specialty	
		Technical Sciences	Mechanical Engineering	Control Systems	
8.	If employed, state the institution where he/she works and the title and area in which is named	Institution	Title and area		
		Faculty of Mechanical Engineering –Skopje	Assistant Professor, Automation		
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.	Programmable Logic Controllers	Automatics and Control Systems, Faculty of Mechanical Engineering – Skopje	
		2.	Control and automation of HEP	Energetics and Ecology/ Faculty of Mechanical Engineering – Skopje	
	9.2	List of courses that the teacher is lecturing in the second cycle			
		No.	Course	Study program/institution	
		1.	Computer control of machines and processes	Automatics and Control Systems, Faculty of Mechanical Engineering – Skopje	
	9.3	List of courses that the teacher is lecturing in the third cycle			
		No.	Course	Study program/institution	
		1.			
	10.	Selected work in the past five years			
			Relevant scientific printed paper (up to 5)		

	10.1.	No.	Author	Title	Publisher/year
		1.	Darko Babunski, Marija Lazarevikj, Emil Zaev, Zoran Markov	Direct Tool For Generation Of The Optimal Geometry Of a Francis Turbine Guide Vane System	MECO 2020, Budva, Montenegro, 8th-11th June 2020
		2.	Buchkovski A., Markov Z., Iliev V., Babunski D.	Use of Reinforcement Learning in the Modeling of Ring-Type Water Networks	12th Mediterranean Conference on Embedded Computing (MECO), 06-10.06.2023, Budva, Montenegro, 1-4
		3.	Emil Zaev, Darko Babunski, Marija Lazarevikj, and Radmila Koleva	Energy flexibility scenarios for North Macedonia	39th IAHR World Congress Granada, Spain, 2022
		4.	Radmila Koleva, Emil Zaev, Darko Babunski, Gerhard Rath, Dimitar Ninevski	IoT System for Real-Time Water Quality Measurement and Data Visualization	MECO, Budva, Montenegro, June 2023
		5.	Radmila Koleva, Darko Babunski, Emil Zaev, Gerhard Rath, Filip Poposki	"Neuro-PID Controller Application for Hydro Power Plant Control" (MECO), Budva, Montenegro, June 2022	(MECO), Budva, Montenegro, June 2022
	10.2.	Participation in scientific national and international projects (up to 5)			
		No.	Author	Title	Publisher/year
		1.	E. Zaev, D. Babunski, A. Tuneski, L. Trajkovski	Development Of Concepts And Control Strategies With Improved Energy Efficiency For Hydraulic Systems In Heavy Machinery	Bilateral project Macedonia-Austrian, 2018-2020
		2.	D. Babunski, E. Zaev, A. Tuneski, L. Trajkovski, R. Koleva	Development of index and IoT system for Real-Time monitoring of surface water quality	Bilateral project Macedonia-Austrian, 2022-2024
		3.	D. Babunski, E. Zaev, Laze Trajkovski, Z. Markov, A. Tunevski, R. Koleva, M. Lazarevik, Filip Popovski	Development of index and IoT system for real-time monitoring of surface water quality	Macedonia – Austrian bilateral project, Financed by Ministry of Education and Science Republic of

					N. Macedonia, Jan. 2022-Dec. 2023	
	10.3.	Printed books in the last five years (up to 5)				
		No.	Author	Title	Publisher/year	
	1.		Darko Babunski, Zoran Markov, Iljco Jovanoski, Charalampos Skoulikaris, Atanasko Tuneski, Yiannis Xenidis, Antigoni Zafirakou	Water Management of Cross-border Waterbodies Possibilities for joint cooperation in coping with the challenges	Konrad Adenauer / MFS, 2020	
	2.		Emil Zaev, Zoran Markov, Darko Babunski	Systems for management and monitoring of the environment	Konrad Adenauer / MFS, 2021	
	10.4.	Printed professional papers in the last 5 years (up to 5)				
		No.	Author	Title	Publisher/year	
	1.					
11.	Supervision (mentorship) of undergraduate, master and doctoral studies students					
	11.1.	Undergraduate			12	
	11.2.	Master			5	
	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.					
	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)	Viktor Iliev		
2.	Date of birth	02.04.1979		
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	2015	Faculty of Mechanical engineering - Skopje
		M. Sc. in Mechanical Engineering	2011	Faculty of Mechanical engineering - Skopje
		B. Sc. in Mechanical Engineering	2002	Faculty of Mechanical engineering - Skopje
6.	Area, field and particular specialty of master of science degree	Area	Field	Specialty
		Technical-technological sciences	Mechanical	Fluid mechanic and fluid flow systems (21420)
7.	Area, field and area of doctoral degree	Area	Field	Specialty
		Technical-technological sciences	Mechanical	Fluid mechanic and fluid flow systems (21420)
8.	If employed, state the institution where he/she works and the title and area in which is named	Institution	Title and area	
		University of Ss Cyril and Methodius, faculty of Mechanical engineering	Assistant Professor, Fluid mechanics and fluid flow systems (21420)	
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.	Energy pipeline systems	HPE (Hydraulic power engineering) / FME
		2.	Water supply and irrigation systems	HPE / FME
		3.	Unsteady flows in HEP	HPE / FME
	9.2.	List of courses that the teacher is lecturing in the second cycle		
		No.	Course	Study program/institution
		1.	Measurements, monitoring and data acquisition	AFI / FME
		2.	Selected chapters of Fluid Mechanics	EE / FME
3.		Experimental engineering	EE / FME	
4.		Control of HEP	AFI / FME	

	9.3.	List of courses that the teacher is lecturing in the third cycle		
	No.	Course	Study program/institution	
	1.	Experimental and numerical (CAX) investigation in fluid mechanics and hydraulic machines	Mechanical engineering / FME	
	2.			
10.	Selected work in the past five years			
10.1.	Relevant scientific printed paper (up to 5)			
	No.	Author	Title	Publisher/year
	1.	Aleksandar Buchkovski, Zoran Markov, Viktor Iliev, Darko Babunski	Use of reinforcement learning in the modeling of ring-type water networks	MECO June 2023
	2.	Viktor Iliev, Marija Lazarevikj, Aleksandar Stojanovski, Martin Oreshkov	Analysis of aerodynamic characteristics of racing car	International journal of Engineering research and application, March 2023
	3.	Valentino Stojkovski, Marija Lazarevikj, Viktor Iliev	Transient condition at the pump station with combined pumping units	SimTerm, October 2022
	4.	Buchkovski A., Markov Z., Iliev V.	Methodology of simulation, modeling and examination of ring-type water supply networks	Mechanical Engineering -Scientific Journal 40(2) 2022, 111-116
	5.	Viktor Iliev, Marija Lazarevikj, Viktor Aleksoski	Numerical and Experimental Investigation of Airfoil Performance in a Wind Tunnel	American journal of engineering research, April 2020
10.2.	Participation in scientific national and international projects (up to 5)			
	No.	Author	Title	Publisher/year
	1.	Viktor Iliev et. al	Numerical and experimental investigation of aerodynamic performance of racing car model	UKiM, 02.2022-02.2023
	2.	Viktor Iliev et. al	Laboratory investigation of mini water turbine for water pipelines networks	Faculty of Mechanical Engineering -Skopje, supported by FITR, 2020-2021
	3.	Viktor Iliev et. al	Experimental investigation of wind turbine model in laboratory conditions	Faculty of Mechanical Engineering -Skopje, supported by FITR, 2020-2021
	4.			
	5.			
Printed books in the last five years (up to 5)				

	10.3.	No.	Author	Title	Publisher/year
		1.			
	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			23
	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
		1.			Year

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)	Emil Zaev		
2.	Date of birth	13.02.1976		
3.	Scientific degree / Title	Ph.D./Full Professor		
4.	Title of the scientific degree	Ph.D. in Technical Sciences		
5.	Year and institution of the scientific degree	Education	Year	Institution
		Ph.D	2013	Faculty of Mechanical Engineering - Skopje
		M.Sc	2006	Faculty of Mechanical Engineering - Skopje
		B.Sc	1999	Faculty of Mechanical Engineering - Skopje
6.	Area, field and particular specialty of master of science degree	Area	Field	Specialty
		Technical Sciences	Mechanical Engineering	automation
7.	Area, field and area of doctoral degree	Area	Field	Specialty
		Technical Sciences	Mechanical Engineering	automation
8.	If employed, state the institution where he/she works and the title and area in which is named	Institution	Title and area	
		Faculty of Mechanical Engineering –Skopje	Full Professor, Automation	
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.	Monitoring and Control	Automatics and Control Systems, Energetics and Ecology/ Faculty of Mechanical Engineering – Skopje
		2.	Hydraulic control systems	Automatics and Control Systems, Energetics and Ecology/ Faculty of Mechanical Engineering – Skopje
		3.	Practice in the industry, small and medium enterprises	Automatics and Control Systems/ Faculty of Mechanical Engineering – Skopje
		4.	Real-time systems and simulations	Automatics and Control Systems/ Faculty of Mechanical Engineering – Skopje
		5.	Computer control of machines and processes	Automatics and Control Systems/ Faculty of Mechanical Engineering – Skopje
	9.2	List of courses that the teacher is lecturing in the second cycle		
		No.	Course	Study program/institution
		1.	Real-time systems and hardware-in-the-loop simulations	Automatics and Control Systems/ Faculty of Mechanical Engineering – Skopje
	2.	Proportional and servo technique (advanced level)	Automatics and Control Systems/ Faculty of Mechanical Engineering – Skopje	

		3.	Computer control of systems and processes (advanced level)	Automatics and Control Systems/ Faculty of Mechanical Engineering – Skopje
		4.	Monitoring and control (advanced level)	Automatics and Control Systems/ Faculty of Mechanical Engineering – Skopje
		5.	Automation of environmental processes	Energetics and Ecology/ Faculty of Mechanical Engineering – Skopje
		6.	Control systems for wastewater treatment plants	Energetics and Ecology/ Faculty of Mechanical Engineering – Skopje
	9.3	List of courses that the teacher is lecturing in the third cycle		
		No.	Course	Study program/institution
		1.	Real-time control	Mechanical engineering/ Faculty of Mechanical Engineering – Skopje
		2.	Monitoring and control (advanced chapters)	Mechanical engineering/ Faculty of Mechanical Engineering – Skopje
		3.	Automation of machines and processes (advanced chapters)	Mechanical engineering/ Faculty of Mechanical Engineering – Skopje
10.	Selected work in the past five years			
	10.1.	Relevant scientific printed paper (up to 5)		
		No.	Author	Title
		1.	Emil Zaev, Darko Babunski, Marija Lazarevikj, and Radmila Koleva	“Energy flexibility scenarios for North Macedonia”
		2.	Radmila Koleva, Emil Zaev, Darko Babunski, Gerhard Rath, Dimitar Ninevski	“IoT System for Real-Time Water Quality Measurement and Data Visualization”
		3.	Radmila Koleva, Darko Babunski, Emil Zaev, Gerhard Rath, Filip Poposki	“Neuro-PID Controller Application for Hydro Power Plant Control” (MECO), Budva, Montenegro, June 2022
		4.	Gerhard Rath, Emil Zaev, Goran Stojanoski and Darko Babunski	“Design of Pressure Control for Optimal Damping in Individual Metering Systems”
		5.	Emil Zaev, Darko Babunski, Aleksandar Jovanov, Gerhard Rath, Maximilian Pablo Payr	“Hardware-in-the-loop for Simulation and Control of Greenhouse Climate”
				39th IAHR World Congress Granada, Spain, 2022
				MECO, Budva, Montenegro, June 2023
				(MECO), Budva, Montenegro, June 2022
				SICFP`21, Linköping, Sweden, 2021
				MECO, Budva, Montenegro, June 2021
	10.2.	Participation in scientific national and international projects (up to 5)		
		No.	Author	Title
		1.	D. Babunski, E. Zaev, Laze Trajkovski, Z. Markov, A. Tunevski, R. Koleva, M. Lazarevik, Filip Popovski	“Development of index and IoT system for real-time monitoring of surface water quality”
				Macedonian – Austrian bilateral project,

					Financed by Ministry of Education and Science Republic of N. Macedonia , Jan. 2022-Dec. 2023
	2.	Emil Zaev et al.,	"Development of cooperative training program: Automation of hydraulic and pneumatic systems in the industry (industry 4.0)"		Regional Challenge Fund (RCF), 2021-
	3.	Emil Zaev, et al.	"Development Of Concepts And Control Strategies With Improved Energy Efficiency For Hydraulic Systems In Heavy Machinery"		Macedonia n – Austrian bilateral project, Financed by Ministry of Education and Science Republic of N. Macedonia , 2018-2028
	4.				
	5.				
10.3.	Printed books in the last five years (up to 5)				
	No.	Author	Title		Publisher/year
	1.	Emil Zaev, Zoran Markov, Darko Babunski	Systems for monitoring and control of the environment		2021
10.4.	Printed professional papers in the last 5 years (up to 5)				
	No.	Author	Title		Publisher/year
	1.				
11.	Supervision (mentorship) of undergraduate, master and doctoral studies students				
11.1.	Undergraduate			5	
11.2.	Master			3	
11.3.	Doctoral			5	
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)	Igor Shesho		
2.	Date of birth	18.07.1982		
3.	Scientific degree/Title	VIII/PhD		
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	2015	University "SS.Cyril and Methodius" in Skopje Faculty of Mechanical Engineering
		MSc Technical Sciences	2009	University "SS.Cyril and Methodius" in Skopje Faculty of Mechanical Engineering
		BSc Technical Sciences – Mechanical eng.	2006	University "SS.Cyril and Methodius" in Skopje Faculty of Mechanical Engineering
6.	Area, field and particular specialty of master of science degree	Area	Field	Specialty
		Technical-technological sciences	Thermotechnics	Heating Ventilation and Air Conditioning
7.	Area, field and particular specialty of Doctoral degree	Area	Field	Specialty
		Technical-technological sciences	Energetics	Non conventional energy sources, 20505
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" in Skopje Faculty of Mechanical Engineering	Associate professor, Non conventional energy	

				sources, 205 05
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.	Renewable energy sources	EE, TEI, MHT,	
	2.	Thermal machines and devices	MHT, AFI, HEI, MPI	
	3.	Applied software in thermal engineering	EE, TEI	
	4.	Project in renewable energy sources	EE, TEI	
		Practice	TEI	
		Basic energy economics	EE, TEI	
9.2.	List of courses that the teacher is lecturing in the second cycle			
	No.	Course	Study program/Institution	
	1.	Renewable energy sources – Advance Level I	EE, SEE, TEI	
	2.	Non – Conventional power plants – Advanced Level I	TEI	
	3.	Energy Economics	EE, TEI	
	4.	Modeling and simulation of energy processes	EE, TEI	
9.3.	List of courses that the teacher is lecturing in the third cycle			
	No.	Course	Study program/Institution	
	1.	Energy efficiency	Mechanical engineering	
	2.	Nonconventional power plants	Mechanical engineering	
	3.	Renewable energy sources – thermal transformation	Mechanical engineering	
	4.			
10.	Selected results in the past five years			
10.1	Relevant printed scientific papers (up to 5)			
	No.	Author	Title	Publisher/year
	1.	I.Shesho, R.Filkoski, D. Tashevski, M.Uler-Zefikj	Optimal Integration of Solar Assisted Heating Systems in Residential Buildings	Energija, ekonomija, ekologija, 4, XXIII, 2021
	2.	B.Hoxha, I.Shesho, R.Filkoski	Analysis of Wind Turbine Distances Using a Novel Techno-Spatial Approach in Complex Wind Farm Terrains	Sustainability, MDPI, 14, 13688, 2022
	3.	I.Shesho, M.Uler-Zefikj, R.Filkoski, D.Tashevski	The Importance of District Heating Systems in Periods of Energy Crisis: Case Study for the City of Skopje	Energija, ekonomija, ekologija, 2022, god. XXIV, br. 2
	4.	I.Shesho, A.Shesho	Cost evaluation of technologies for space heating, cooling and Domestic hot water for multifamily apartments in r. N. Macedonia	ANNALS of Faculty Engineering Hunedoara – International Journal of Engineering

					Tome XX [2022]
	5.	E.Lazova, I.Shesho	Assesment of the macedonian power system potential toward green energy transition		ANNALS of Faculty Engineering Hunedoara – International journal of engineering Tome XXI, 2023
10.2	Participation in scientific national and international projects (up to 5)				
	No.	Author	Title		Publisher/year
	1.	Group of authors	Development of an ORC plant for the use of waste heat - ORMAK		Fund for Innovation and Technological Development, 2019
	2.	Igor Shesho et.al	Techno-economic and ecological analysis of the potential for the implementation of renewable energy sources in a central hot water heating system in an urban environment		Faculty for Mechanical engineering Skopje 2019-2020
10.3	Printed books in the last five years (up to 5)				
	No.	Author	Title		Publisher/year
	1.	Д.Ташевски, И.Шешо, Ф.Здравевски	Парни и гасни турбини		Decision for publishing a teaching book nr. 02-215/1, 2021. GrafoProm Bitola / 2023
	2.	Д. Ташевски, И. Шешо, С. Арменски	Термоенергетски постројки Учебник (прво издание)		Decision for publishing a teaching book nr. 02-87/2, in progress, e-biblioteka UKIM
	3.	Д. Ташевски, И. Шешо,	Нуклеарни термоцентрали Учебник (прво издание)		Decision for publishing a teaching book nr. 02-86/2, in progress, e-biblioteka UKIM
10.4	Printed professional papers in the last 5 years (up to 5)				
	No.	Author	Title		Publisher/year

		1.	Group of authors	Final design and construction of Wastewater Treatment Plant in Kocani – Mechanical design HVAC	Faculty for Civil Engineering, 2018
		2.	I.Shesho et.al	Study, Assessment of the remaining service life of WB boilers in ESM, subsidiary "Energetika" - Skopje	CIRKO, 2020
		3.	I.Shesho	Ventilation of machine room with biogas cogenerative devices	Bioenterprise, 2021
		4.	I.Shesho	Techno-economic analyzes of the possibilities for integrating a system with solar collectors for heating DHW and heating and cooling system For object: x. Sileks	h.Sileks,2022
		5.			
11.	Supervision (mentorship) of undergraduate, master and doctoral studies students				
	11.1	Undergraduate			22
	11.2	Master			3 (2 currently)
	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.			
		2.			
	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.			
		2.			
	12.3	Proof of at least three participation in international meetings in the last four years			
		No.	Author	Title	International meeting/conference
		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)	Marija Lazarevikj		
2.	Date of birth	16.11.1993		
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	2022	UKIM Skopje Macedonia Faculty of Mechanical Engineering
		MSc Mechanical engineering	2018	UKIM Skopje Macedonia Faculty of Mechanical Engineering
		BSc Mechanical engineering	2016	UKIM Skopje Macedonia Faculty of Mechanical Engineering
6.	Area, field and particular specialty of Master of Science degree	Area	Field	Specialty
		Mechanical engineering	Energetic	Thermal engineering (Fluid flow and heat transfer)
7.	Area, field and area of doctoral degree	Area	Field	Specialty
		Mechanical engineering	Energetic	Fluid mechanics and fluid flow systems
8.	If employed, state the institution where he/she works and the title and area in which is named	Institution		Title and area
		Faculty of Mechanical Engineering Skopje, Ss. Cyril and Methodius University in Skopje		Assistant Professor / Hydraulic 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.	Introduction to mechanical engineering	All / FME
		2.	Fluid mechanics	PI, TML, TI, HEI, MPI, IIM, MV, EE, MHT, AUS / FME
		3.	Fluid dynamics and CFD	EE, HEI, MHT / FME
		4.	Basics of Turbomachinery	EE, HEI / FME
		5.	Fluid flow measurements	HEI, AUS / FME
		6.	Hydraulic turbines	HEI / FME
		7.	Hydropower plants	EE, AUS / FME
	8.	Gas systems	EE, HEI / FME	
	9.2.	List of courses that the teacher is lecturing in the second cycle		
		No.	Course	Study program/institution
		1.		
		2.		
3.				
4.				
5.				

	6.				
	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.	Karapici V., Trojer A., Lazarevikj M., Pluskal T., Chernobrova A., Nezirić E., Zuecco G., Alerci A., Seydoux M., Doujak E., Rudolf P.	Opportunities of hidden hydropower technologies towards the energy transition	Energy Reports 12, 2024, Pages 5633-5647, IF 4.7
		2.	Lazarevikj M., Stojkovski F., Markov Z., Iliev I., Dahlhaug O. G.,	Parameter based tool for Francis turbine guide vanes design using coupled MATLAB-ANSYS approach	JSDEWES 10(3), 2022 IF 2.1
		3.	Lazarevikj M., Markov Z.,	Automated hydraulic design procedure for a Francis turbine spiral casing	IOP Conference Series: Earth and Environmental Science 1079 012009, Proceedings of 31st IAHR Symposium on Hydraulic Machinery and Systems, 26.06-01.07.2022, Trondheim, pp.1-12
		4.	Lazarevikj M., Markov Z.,	Analysis of the influence of Francis turbine guide vane axis location on its structural parameters	Proceeding of the 39th IAHR World Congress, 19-24.06.2022, Granada, Spain, pp.4463-4469
		5.	Lazarevikj M., Markov Z., Stojkovski V.,	Dynamic loads on guide vanes of a Francis turbine with variable speed	20th International Conference of Thermal Science and Engineering of Serbia – SimTerm 2022, 18-21.10.2022, Nish, Serbia, Conference Proceedings ISBN 978-86-6055-163-6, pp.188-198
	10.2.	Participation in scientific national and international projects (up to 5)			
		No.	Author	Title	Publisher/year
1.		Coordinator: Lazarevikj M. Participants: Zefikj M., Krstevska A., Stojkovski V., Markov Z., Filkoski R., Gavriloski M.	International project “ANSYS Funded Curriculum”	ANSYS Inc. 01.2023-01.2024	
	2.	Coordinator: Ole G. Dahlhaug	International project: “Increasing the value of Hydropower	Horizon 2020, 05.2018-05.2022	

			Participants: Lazarevikj M. et al.	through increased Flexibility (HydroFlex)”				
	3.		Coordinator: Jordanov I. Participants: Lazarevikj M. et al.	National project: “Inno Fab Lab”	FITR, 08.2022-04.2023			
	4.		Coordinator: Iliev V. Participants: Lazarevikj M. et al.	Numerical and experimental investigation of aerodynamic performance of racing car model	UKiM, 02.2022- 02.2023			
	10.3.	Printed books in the last five years (up to 5)						
		No.	Author	Title	Publisher/year			
		1.						
		2.						
		3.						
	10.4.	Printed professional papers in the last 5 years (up to 5)						
		No.	Author	Title	Publisher/year			
		1.	Stojkovski V., Lazarevikj M., Iliev V.,	Transient conditions at the pump station with combined pumping units	20th International Conference of Thermal Science and Engineering of Serbia – SimTerm 2022, 18- 21.10.2022, Nish, Serbia, Conference Proceedings ISBN 978-86-6055-163-6, pp.257-265			
		2.	Stojkovski V., Kostikj Z., Iliev V., Lazarevikj M.	Comparison of measured and numerical results for unsteady fluid flow at water distribution system	5 International Scientific Conference COMETa 2020, Conference Proceedings, ISBN 978-99976-719-8-1, pp.372-382			
		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.						
		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.				
		3.				
		4.				
		5.				
	12.3.	Proof of at least three international meetings' participation in the past four years				
		No.	Author	Title	International meeting/conf erence	year
		1.				
		2.				
		3.				
		4.				
		5				

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)	Aleksandar Gjerasimovski			
2.	Date of birth	19.12.1994			
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	2022	UKIM Skopje Macedonia Faculty of Mechanical Engineering	
		MSc Technical Sciences	2018	UKIM Skopje Macedonia Faculty of Mechanical Engineering	
		BSc Technical Sciences – Mechanical eng.	2017	UKIM Skopje Macedonia Faculty of Mechanical Engineering	
6.	Area, field and particular specialty of Master of Science degree	Area	Field	Specialty	
		Mechanical engineering	Energetic	Polygeneration systems	
7.	Area, field and area of doctoral degree	Area	Field	Specialty	
		Mechanical engineering	Energetic	Polygeneration systems	
8.	If employed, state the institution where he/she works and the title and area in which is named	Institution		Title and area	
		Faculty of Mechanical Engineering Skopje, University Ss. Cyril and Methodius in Skopje		Assistant Professor / Thermal 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.	Compressors and systems	TEI, EE	
		2.	Refrigeration technology and systems	TEI, EE	
		3.	Thermal measurements	TEI	
		4.	Technical gases and compressor stations	TEI	
	9.2.	List of courses that the teacher is lecturing in the second cycle			
		No.	Course	Study program/institution	
		1.			
		2.		-	
		3.			
		4.			
		5.			
	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.	Gjerasimovski A., Sharevska M., Gjerasimovska N., Sharevska M., Šarevski, M	Energy efficiency of combined compressor- ejector refrigeration systems	Proceedings KGH / 2021	
	2.	Gjerasimovski, A., Sharevska, M., Gjerasimovska, N., Sharevska, M., Šarevski, V.	HVAC&R poly – generation system with a gas engine and conventional cooling machines/heat pumps	Mechanical Engineering Scientific Journal / 2022	
	3.	Gjerasimovski, A., Gjerasimovska, N., Šarevski, V.	Energy efficiency of industrial concentrators with ejector thermocompression	Mechanical Engineering Scientific Journal / 2023	
	4.	Gjerasimovski, A., Sharevska, M., Gjerasimovska, N., Sharevska, M., Filkoski, R.	Thermal characteristics of combined compressor – ejector refrigeration / heat pump systems for HVAC&R	Thermal Science / 2024	
	5.	Gjerasimovski, A., Gjerasimovska, N., Šarevski, V.	Energy efficient systems for heating, ventilation and air conditioning with thermocompression and thermal storage	Časopis KGH / 2024	
	10.2.	Participation in scientific national and international projects (up to 5)			
		No.	Author	Title	Publisher/year
		1.			
	10.3.	Printed books in the last five years (up to 5)			
		No.	Author	Title	Publisher/year
		1.			
		2.			
		3.			
	10.4.	Printed professional papers in the last 5 years (up to 5)			
		No.	Author	Title	Publisher/year
		1.	Šarevski, M., Šarevski, V., Gjerasimovski, A.	Thermal oil cooling system, MZT Learnica	2017
		2.	Šarevski, M., Šarevski, V., Gjerasimovski, A.	Polygeneration system for residential building, Alumina - Skopje	2018
		3.	Šarevski, M., Šarevski, V., Gjerasimovski, A.	Reconstructuion of steam- condensate system in hospital Bardovci	2018
		4.			
		5.			
11.	Supervision (mentorship) of undergraduate, master and doctoral studies students				
	11.1.	Undergraduate			
	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.			

		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.				
		3.				
		4.				
		5.				
	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.				
		4.				
		5.				

APPENDICES

Annex no. 5
Diploma Supplement

„SS CYRIL AND METHODIUS“ UNIVERSITY IN SKOPJE
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 - Sustainable Energy and Environment
2.3. Name of study programme, main area, field, and branch of study	Sustainable Energy and Environment Technical-technological sciences 205 Energy 214 Mechanical engineering 225 Environment
2.4. Name and status of awarding institution	Ss: Cyril and Methodius University in Skopje Faculty of Mechanical Engineering - Skopje
2.5. Name and status of higher education institution administering the studies (if different)	
2.6. Language of instruction	English
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
--	--

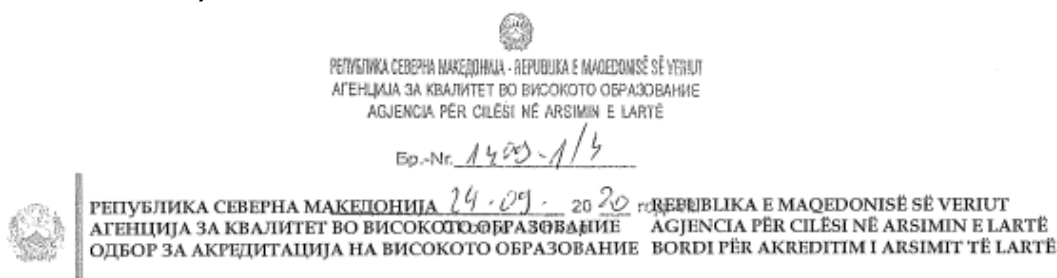
4. Information on the contents and results gained	
4.1. Mode of study (full-time, part-time)	Full-time
4.2. Programme requirements and results	• Knowledge of energy sources, ways of transformation and its efficient use • Operation and maintenance of power plants • Regulations and testing of machines and power plants • Technical control, supervision and inspection during the construction of power plants and systems • Development of expert reports on energy machinery and
4.3. Programme details (orientation, module, grades, ECTS credits) ⁶	The Results Certificate contains the courses 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 The Appendix mentioned in 4.3 is the Results Certificate

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	
7. Certification of the supplement		
7.1. Date and place		
7.2. Name and signature	Professor Zlatko Petreski, PhD	Professor Biljana Angelova, PhD
7.3. Capacity of the signee	Dean	Rector
7.4. Seal	Seal of the Unit	Seal of the University

Annex no. 6

Copy of the Decision on accreditation of a study program issued by the Board for Accreditation and Evaluation of Higher Education of the Republic of Macedonia, i.e. the Board for Accreditation, a body within AKVO (if the study program is submitted for re-accreditation)



Врз основа на член 48 став (2) точка 6, член 145 став (2) и член 227 од Законот за високото образование* („Службен весник на Република Македонија“ бр. 82/18), Одборот за акредитација на високото образование на Република Северна Македонија, на својата 5 седница одржана на 29.07.2020 година, донесе

РЕШЕНИЕ

за акредитација на студиската програма „Sustainable energy and environment, Одржлива енергетика и екологија“, од втор циклус магистерски академски студии на англиски јазик на Машински факултет при Универзитет „Св. Кирил и Методиј“ Скопје

1. Се акредитира студиската програма за „Sustainable energy and environment, Одржлива енергетика и екологија“, од втор циклус магистерски студии на англиски јазик на Машински факултет при Универзитет „Св. Кирил и Методиј“ Скопје, согласно Законот за високо образование* („Службен весник на Република Македонија“ бр.82/18), Уредбата за нормативите и стандардите за основање на високообразовни установи и за вршење високообразовна дејност („Службен весник на Република Македонија“ бр.103/10, 168/10 и 10/11) и Класификацијата на научно-истражувачки подрачја, полиња и области според Меѓународната франскативна класификација (дадена како Прилог 1 на наведената Уредба).

2. Акредитација за студиската програма од точка 1 на ова решение е за период од пет студиски години, почнувајќи од студиската 2020/2021 година.

3. По завршување на студиите на студиската програма од точка 1 од ова решение, студентот се стекнува со 60 ЕКТС кредити и се стекнува со академски назив: Магистер по машинство – Одржлива енергетика и екологија /во меѓународен промет академски назив Master of science in mechanical engineering - sustainable energy and environment.

Научно - истражувачко подрачје: Техничко - технолошки науки.

Научно – истражувачко поле: Машинство, Контрола на квалитет, Индустриско инженерство и Менаџмент, Енергетика, Транспорт, Животна средина, Градежништво и управување со води, Регулација и управување со технолошки процеси.

Научно – истражувачка област: Области од наведените научни - истражувачки полиња согласно изучуваните предмети и програми во студиската програма како и области кои кореспондираат на изучуваните предметни програми во студиската програма, а припаѓаат во научноистражувачки полиња кои не се наведени.

4. Вкупниот број на студенти кои можат да бидат запишани на наведената студиска програма од точка 1 на ова решение изнесува 30 студенти.

РЕПУБЛИКА СЕВЕРНА МАКЕДОНИЈА
УНИВЕРЗИТЕТ „СВ. КИРИЛ И МЕТОДИЈ“ СКОПЈЕ
МАШИНСКИ ФАКУЛТЕТ
С К О П Ј Е

Примено:	28.09.2020		
Прилог:	Орг.Един.	Број:	Вредност:
	08	1163	/1



РЕПУБЛИКА СЕВЕРНА МАКЕДОНИЈА
АГЕНЦИЈА ЗА КВАЛИТЕТ ВО ВИСОКОТО ОБРАЗОВАНИЕ
ОДБОР ЗА АКРЕДИТАЦИЈА НА ВИСОКОТО ОБРАЗОВАНИЕ

REPUBLIKA E MAQEDONISË SË VERIUT
AGJENCIA PËR CILËSI NË ARSIMIN E LARTË
BORDI PËR AKREDITIM I ARSIMIT TË LARTË

5. Ова решение е конечно и влегува во сила со денот на донесувањето.

Образложение

По предходно донесената одлука бр. 02-1135/4 од 29.11.2019 година од страна Сенатот на универзитетот, за усвојување на студиската програма од втор циклус на студии „Sustainable energy and environment, Одржлива енергетика и екологија“, на англиски јазик на Машински факултет при Универзитет „Св. Кирил и Методиј“ Скопје, до Одборот за акредитација на високото образование, достави барање бр.1409-1/2 од 08.01.2020 година за прифаќање на елаборат, односно за акредитација на предметната студиска програма.

Одборот за акредитација на високото образование, на 3-та седницата одржана на 01.07.2020 година, формира стручна комисија за разгледување на барањето за акредитација со придружната документација и подготвување на извештај по однос на барањето и документацијата.

Врз основа на позитивната оценка содржана во извештајот на стручната комисија, бр.1409-1/3 од 31.08.2020 година, согласно Законот за високо образование* („Службен весник на Република Македонија“ бр.82/18), Уредбата за нормативите и стандардите за основање на високообразовни установи и за вршење високообразовна дејност („Службен весник на Република Македонија“ бр.103/10, 168/10 и 10/11) и Класификацијата на научно-истражувачки подрачја, полиња и области според Меѓународната фраскативна класификација и Правилникот за организацијата, работата, начинот на одлучување, методологијата за акредитација и евалуација, стандардите за акредитација и евалуација, како и други прашања во врска со работата на Одборот за акредитација и евалуација на високото образование („Службен весник на Република Македонија“ бр.151/12), Одборот за акредитација на високото образование, на својата 5-та седница одржана на 29.07.2020 година, одлучи како во диспозитивот на ова решение.

Правна поука: Решението за акредитација на студиска програма е конечно и против него може да се поднесе тужба до Управниот суд.

Претседател
на Одборот за акредитација на високото образование

Академик Владо Камбовски



Владимир Владимирович

Annex no. 7

Copy of the Decision to start work on a study program issued by the MES of RSM or AKVO (if the study program is submitted for re-accreditation)



Врз основа на член 145 став (6) и член 227 од Законот за високото образование („Службен весник на Република Македонија“ бр. 82/18), директорот на Агенцијата за квалитет во високото образование, донесе

РЕШЕНИЕ

за почеток со работа на студиската програма од втор циклус магистерски академски студии (60 ЕКТС) на англиски јазик по „Sustainable energy and environment / Одржлива енергетика и екологија“ на Машински факултет при Универзитет „Св.Кирил и Методиј“ во Скопје

1. Со ова решение се утврдува дека се исполнети условите за почеток со работа на студиската програма од втор циклус магистерски академски студии (60 ЕКТС) на англиски јазик по „Sustainable energy and environment / Одржлива енергетика и екологија“ на Машински факултет при Универзитет „Св.Кирил и Методиј“ во Скопје.
2. Ова решение влегува во сила со денот на донесување.

Образложение

По добивање на Решение за акредитација бр.1409-1/4 од 24.09.2020 година од страна на Одборот за акредитација на високото образование, Машински факултет при Универзитет „Св.Кирил и Методиј“ во Скопје се обрати со барање бр.08-325/1 од 22.02.2021 година, до Агенцијата за квалитет во високото образование, под наш бр. 08-85/1 од 23.02.2021 година, за утврдување на условите за почеток со работа на студиската програма од втор циклус магистерски академски студии (60 ЕКТС) на англиски јазик по „Sustainable energy and environment / Одржлива енергетика и екологија“ на Машински факултет при Универзитет „Св.Кирил и Методиј“ во Скопје.

Директорот на Агенцијата за квалитет во високото образование, со Решение бр.08-85/2 од 10.03.2021 година, формира Комисија за утврдување на исполнетоста на условите за почеток со работа на студиската програма наведена во точка 1 на ова решение.

Комисијата, на ден 15.03.2021 година, изврши увид и изготви Извештај бр. 08-85/3 од 18.03.2021 година, каде е наведено дека за на студиската програма од втор циклус магистерски академски студии (60 ЕКТС) на англиски јазик по „Sustainable energy and environment / Одржлива енергетика и екологија“ на Машински факултет при Универзитет „Св.Кирил и Методиј“ во Скопје, се исполнети условите согласно одредбите утврдени со Законот за високото образование и Уредбата за нормативи и стандарди за основање на високообразовни установи и за вршење на високообразовна дејност („Службен весник на Република Македонија“ бр. 103/10, 168/10 и 10/11).

Имајќи го во предвид изнесеното, се одлучи како во диспозитивот на ова решение.

ПРАВНА ПОУКА: Против ова решение, може да се заведе управен спор, со поднесување на тужба до Управниот суд на Република Северна Македонија, во рок од 30 дена од денот на приемот на ова решение.

Доставено до:
 - Високообразовната установа
 - Архива

изработил: Милена Ефремова *Ефрм*

ДИРЕКТОР/ DREJTOR

Dr. Agim Rushiti



Annex no. 8**Lease agreements****N/A****Annex no. 9****Bank guarantee – for private higher education institutions
Financial plan in cycles of three or four years****N/A****Annex no. 10****M1/M2 – for private higher education institutions****N/A****Annex no. 11****Program/Strategy for the development and work of the higher education institution
for a period of 3 years**

The Faculty of mechanical engineering has adopted the Policy for Quality management. The program is available on-line. The program allows to realize the high level quality of education, research and applicative work of the Institution.

Link:

https://www.ukim.edu.mk/dokumenti_m/Strategija_i_AP/Strategija_na_UKIM_2024-2029_EN.pdf

Annex no. 12**Action plan for realization of the program/Strategy for the development and
operation of the higher education institution for a period of 3 years****Link:**

https://www.ukim.edu.mk/dokumenti_m/Strategija_i_AP/Akcionen_plan_na_UKIM_2024-2029_MK.pdf