Załącznik do uchwały
Nr 000-5/2/2025
Senatu URad.
z dnia 24 kwietnia 2025 r.

CASIMIR PULASKI RADOM UNIVERSITY

Study programme
MECHANICAL ENGINEERING
First-cycle
Education profile: general academic
full-time and part-time

Radom 2025 r.

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I. GENERAL CHARACTERISTICS OF THE STUDY

1 The name of the field of study

MECHANICAL ENGINEERING

2 ISCED classification

0715 - Mechanics and metallurgy

3 Educational level

First- cycle studies

4 PRK (Polish Qualifications Framework) level

The studies correspond to Polish Qualifications Framework level six

5 Education profile

general academic

6 Science discipline

The field of study *Mechanical Engineering* is assigned to the discipline: *mechanical engineering.*

7 Percentage share of the number of ECTS credits for each discipline

For the *Mechanical Engineering*, 100% of the number of ECTS credits is assigned to the *mechanical engineering* discipline.

8 Name of qualification and the title conferred

After completion of the first-cycle programme the graduate of *Mechanical Engineering* is conferred the title **inżynier.**

II. FIELD OF STUDY LEARNING OUTCOMES:

1 Table of references of the field of study learning outcomes to the universal characteristics of the first-cycle studies specified in the ZSK Act and the characteristics of the second-cycle studies specified in the regulations issued on the basis of Article 7, paragraph 3 of the ZSK Act.

No.	Symbol of the field of study learning outcomes	Description of the field of study learning outcomes	The universal characteristics of the first-cycle studies (U) **symbol**	Characteristics of second-cycle learning outcomes for PRK qualification level six (S) **symbol**
KNOWLEDGE - after completion of the first-cycle programme the graduate …				
1	K_WG01	has knowledge in mathematics concerning: algebra, mathematical analysis, probability theory and selected numerical methods, including the knowledge necessary for: – modeling and analysis of mechanical systems; – performing calculations in the design of technological processes; description and prediction of operating characteristics of technical equipment, technical facilities and systems;	P6U_W	P6S_WG
2	K_WG02	has knowledge in the area of physics, including the basics of mechanics, thermodynamics, optics, electricity and magnetism, nuclear physics, solid state physics and elements of quantum physics, including the knowledge needed to understand, describe and use physical phenomena in the design, manufacturing and operation of mechanical systems;		P6S_WG
3	K_WG03	has the knowledge in the area of chemistry needed to understand and describe the phenomena occurring in the manufacture and operation of machine components;		P6S_WG
4	K_WG04	knows and understands the principles of engineering graphics and the tools used in the preparation of technical documentation;		P6S_WG
5	K_WG05	has a well-organized, theoretically based knowledge in the area of statics of rigid body systems and rigid body kinematics and dynamics, and has a basic knowledge of vibration and noise;		P6S_WG
6	K_WG06	has knowledge in the area of strength analysis of basic mechanical structures;		P6S_WG
7	K_WG07	has knowledge of fluid mechanics and technical thermodynamics required to understand the construction and operation of mechanical, mechatronic;		P6S_WG
8	K_WG08	has knowledge of electrical engineering, electronics, automatics, and computer science in applications in mechanics, mechatronics;		P6S_WG
9	K_WG09	knows and understands the principles of design of machine parts, mechanical structures;		P6S_WG
10	K_WG10	knows and understands selected issues of mechanical engineering, operation, condition diagnosis, repair technology and safe operation;		P6S_WG
11	K_WG11	has knowledge of computer-aided design, manufacturing and operation of mechanical, mechatronic and equipment;		P6S_WG
12	K_WG12	has knowledge of metrology, knows and understands the methods of measurement of basic quantities characteristic of mechanical and equipment engineering, knows the calculation methods and computer tools necessary for the analysis of experimental results;		P6S_WG

13	K_WG13	has knowledge of engineering materials, their research and forming technologies;		P6S_WG
14	K_WG14	has knowledge of contemporary AI applications in various fields, such as data analysis, computer vision, natural language recognition, and autonomous systems.		P6S_WG
15	K_WG15	knows and understands the basic concepts, functions and architecture of ERP and MES systems		P6S_WG
16	K_WG16	knows and understands the basic methods, techniques and tools required for solving simple engineering tasks in the area of construction, manufacturing technology and operation of machinery;		P6S_WG
17	K_WG17	has knowledge of numerical methods used in simulation and analysis of mechanical systems, as well as in the process of their design, manufacturing and operation;		P6S_WG
18	K_WG18	has knowledge of the basics of mechatronics, industrial mechatronics, automotive mechatronics, PLCs and industrial automatic control structures;		P6S_WG
19	K_WG19	has knowledge of industrial sensors, robotics and the construction, programming and control of robots and manipulators;		P6S_WG
20	K_WK20	has knowledge of issues related to robotics, including the classification and construction of robots and their control systems		P6S_WK
21	K_WK21	has knowledge of management, including quality management, production management, logistics and conducting business activity;		P6S_WK
22	K_WK22	knows and understands the concepts and principles in the area of the protection of industrial property and copyright law.		P6S_WK
23	K_WK23	understands the impact of social and civilization changes on the lifestyle of local, regional, national and world communities.		P6S_WK
SKILLS – after completion of the first-cycle programme the graduate …				
24	K_UW01	is able to acquire information from the literature, databases and other sources, including in English or another foreign language; is able to integrate obtained information, interpret it, as well as draw conclusions and formulate and justify opinions	P6U_U	P6S_UW
25	K_UW02	can use analytical, simulation and experimental methods to formulate and solve engineering tasks.		P6S_UW
26	K_UW03	is able to perceive their system and non-technical aspects when formulating and solving engineering tasks;		P6S_UW
27	K_UW04	is able to make a preliminary economic analysis of the engineering activities undertaken in the design, manufacture and operation of machinery and equipment;		P6S_UW
28	K_UW05	is able to use computer methods in solving engineering tasks in the field of design, manufacturing and operation of machinery and equipment;		P6S_UW
29	K_UW06	can use measurement apparatus and methods of estimating measurement errors;		P6S_UW
30	K_UW07	is able to critically analyze how things work and evaluate existing technical solutions, equipment, facilities, systems, processes and services in the construction, manufacture and operation of machinery and equipment;		P6S_UW
31	K_UW08	is able to identify and formulate specifications for simple engineering tasks of a practical nature in the design, manufacture and operation of machinery and equipment;		P6S_UW
32	K_UW09	is able to assess the suitability of routine methods and tools for solving a simple engineering task of a practical nature in the design, manufacture and operation of machinery and equipment, and select and apply the appropriate method and tools;		P6S_UW
33	K_UW10	is able to, according to the given specification, design and implement a simple device, object, system or process, typical of the process of designing, manufacturing and operating machinery and equipment, using appropriate methods, techniques and tools;		P6S_UW

34	K_UW11	can select appropriate engineering materials for the correct operation of machinery and equipment;		P6S_UW
35	K_UW12	is able to select appropriate artificial intelligence methods and tools to solve a specific engineering or research problem		P6S_UW
36	K_UW13	can plan and conduct experiments, including measurements and computer simulations, interpret the results obtained and draw conclusions;		P6S_UW
37	K_UW14	is able to use relevant databases in the process of designing, manufacturing and operating machinery and equipment;		P6S_UW
38	K_UK15	can communicate using a variety of techniques in professional and other settings		P6U_UK
39	K_UK16	is able to prepare a study of problems of basic engineering issues in English or another foreign language recognized as the language of international communication;		P6U_UK
40	K_UK17	is able to produce coherent oral and written statements in English or another foreign language recognized as a language of international communication at the B2 level, including on engineering issues;		P6U_UK
41	K_UK18	is able to search, analyze and use information from sources in English or another foreign language recognized as the language of international communication at the B2 level, including the design, manufacture and operation of machinery and equipment;		P6U_UK
42	K_UO19	is able to work and interact in a group speaking English or another foreign language recognized as a language of international communication at the B2 level, including in the scope relevant to the field of study, taking various roles;		P6S_UO
43	K_UO20	is able to cooperate and act in a group, taking on different roles;		P6S_UO
44	K_UU21	is aware of the need of life-long learning and is able to choose learning methods appropriate for himself/ herself and others.		P6U_UU
SOCIAL COMPETENCES (K) - after completion of the first-cycle programme the graduate …				
45	K_KK01	is ready to complete and critically evaluate specialized knowledge and is able to select sources of knowledge and methods of learning appropriate for himself/herself and others;	P6U_K	P6S_KK
46	K_KK02	is willing to comprehensively analyze and effectively carry out assigned tasks, and in the event of difficulties in solving them, use expert opinion;		P6S_KK
47	K_KO03	is aware of the non-technical aspects of the activities of a mechanical engineer, including, but not limited to, its social consequences and impact on the environment;		P6S_KO
48	K_KO04	is aware of the responsibility associated with decisions, made in the framework of engineering activities, especially in terms of his/her own safety and the safety of others and protection of the environment;		P6S_KO
49	K_KO05	is willing to demonstrate entrepreneurship and ingenuity in activities related to the implementation of professional tasks;		P6S_KO
50	K_KR06	is aware of the importance of the social role of the engineer and the need to take part in providing the public with reliable information and opinions on the achievements of technology and other aspects of technology, especially in the field of mechanics, construction and operation of machinery and equipment;		P6S_KR
51	K_KR07	is aware of the importance of professional conduct, adherence to professional ethics and respect for diversity of views and cultures.		P6S_KR
	Number of outcomes: 23 W 21 U 7 K			

2 Table of coverage of second-cycle characteristics of learning outcomes by the field of study learning outcomes (KEU).

COVERAGE TABLE CHARACTERISTICS OF SECOND-CYCLE LEARNING OUTCOMES BY THE FIELD OF STUDY LEARNING OUTCOMES		
No.	Characteristics of the second cycle learning outcomes for qualifications at PRK level six (S) **symbol**	**Field of study learning outcomes:** (KEU) **symbol**
KNOWLEDGE (W)		
1.	P6S_WG	K_WG01 – K_WG19
2.	P6S_WK	K_WK20 – K_WK23
SKILLS (U)		
3.	P6S_UW	K_UW01 – K_UW14
4.	P6S_UK	K_UK15 – K_UK18
5.	P6S_UO	K_UO19 – K_UO20
6.	P6S_UU	K_UU21
SOCIAL COMPETENCES (K)		
7.	P6S_KK	K_KK01, K_KK02
8.	P6S_KO	K_KO03, K_KO04,K_KO05
9.	P6S_KR	K_KR06, K_KR07
∑	*Information on the number of covered characteristics of the second-cycle level of the PRK typical for qualifications obtained within higher education (S)* **- 9**	

3 Table of coverage of the characteristics of the second-cycle learning outcomes enabling engineering competence by the field of study learning outcomes

TABLE OF COVERAGE OF SECOND-CYCLE CHARACTERISTICS OF LEARNING OUTCOMES ENABLING ENGINEERING COMPETENCE BY THE FIELD OF STUDY LEARNIG OUTCOMES			
No.	**Symbol**	**Description of the characteristics of the second-cycle learning outcomes to achieve engineering competence**	**Reference to the field of study learning outcomes (KEU)**
KNOWLEDGE - after completion of the second-cycle programme the graduate knows…			
1.	P6S_WG	basic processes occurring in the life cycle of equipment, objects and technical systems	K_WG01 – K_WG019
2.	P6S_WK	basic principles of creation and development of various forms of individual entrepreneurship	K_WK20 - K_WK21
SKILLS - after completion of the second-cycle programme the graduate is able to…			
3.	P6S_UW	plan and conduct experiments, including measurements and computer simulations, interpret the results obtained and draw conclusions	K_UW13
		For identifying and formulating specifications for engineering tasks and solving them - can use analytical, simulation, and experimental methods, - can recognize their systemic and non-technical aspects, including ethical aspects, - can make a preliminary economic assessment of the proposed solutions and engineering actions taken	K_UW01 – K_UW06, K_UW08
		make a critical analysis of how existing technical solutions work and evaluate these solutions	K_UW07
		design - according to a given specification - and construct simple devices, objects, systems or implement processes typical for the field of study, using appropriately selected methods, techniques, tools and materials	K_UW09, K_UW14

III. STUDY PROGRAMME DESCRIPTION

1 Mode of study

Studies in the field of *Mechanical Engineering* are conducted in the form of full-time and part-time studies.

2 Number of ECTS credits required for graduation

The number of ECTS credits required for graduation (obtaining a tile of **inżynier**) in *Mechanical Engineering* is 210.

3 Number of semesters

Number of semesters in the field of *Mechanical Engineering* for studies conducted in the form of full-time and part-time studies is **7**.

4 The curriculum

The curriculum for the Bachelor's degree programme in *Mechanical Engineering* separately for each mode of study constitutes **Appendix 1.**

5 Description of individual courses

Description of individual courses (syllabuses) taught in the field of *Mechanical Engineering* constitutes **Appendix No. 2.**

6 Learning outcomes matrix

Matrix of learning outcomes for the Bachelor's degree programme for the field of *Mechanical Engineering* constitutes **Appendix No. 3**.

7 Summary quantitative indicators characterizing the study programme.

Full-time students must obtain 105 (50%) ECTS credits in courses requiring direct participation of academic teachers, while for part-time students 56,16 (26,7%) ECTS credits.

The number of ECTS credits a student receives for research-related activities is 106,5 (50.7%) ECTS.

The total number of ECTS credits from elective courses, both full-time and part-time, is 65, which is about 31% of the total number of ECTS credits in the course of study. Details are summarized in Tables 1, 2 and 3.

Table 1. Summary quantitative indicators of the study programme

No.	Summary quantitative indicators of the study programme	ECTS
1	The total number of ECTS credits allocated to courses with direct participation of academic teachers or other instructors and students:	**105,4*** **57,04****
2	Total number of ECTS credits allocated to elective courses	**65**
3	Total number of ECTS credits assigned to courses in the humanities or social sciences:	**5**
4	Total number of ECTS credits assigned to courses: - related to the conducted scientific research in the discipline(s) relevant to the field of study - in the case of a field of study with a general academic education profile	**106.5**
5	The total number of ECTS credits assigned to the courses related to the disciplines to which the field of study is assigned: - **mechanical engineering** discipline	**210**

** number of credits for studies conducted in a full-time study mode.*
*** number of credits for studies conducted in a part-time study mode*

Table 2. A group of courses related to the conducted scientific research

A group of courses related to ongoing research in the discipline relevant to the field of study					
Course (name)	**Type(s) of the course***	**Number of instruction hours full-time/ part-time**			**Number of ECTS credits**
Engineering mechanics	W/Ć/L	90	/	50	7,5
Physics	W/L	90	/	56	8
Fluid mechanics	W/Ć	45	/	32	3
Strength of materials	W/Ć/L	90	/	45	6
Basics of Technical Thermodynamics	W/Ć/L	60	/	36	5
Materials science	W/L	45	/	25	3
Metrology and measurement systems	W/L	45	/	28	3
Programming and numerical methods	C/P	60	/	32	4
Manufacturing engineering	W/L	135	/	72	9
Basics of machine design	W/C/P	120	/	74	11
Mechatronics and Automatics	W/L	60	/	32	5
Mechanics of structures	W/Ć/L	75	/	40	6
Robotics	W/L	45	/	23	4
Artificial Intelligence	W/L	30	/	20	2
Industrial Controllers PLC	W/L	30	/	20	2
Simulations in Mechanics FEM+CFD+FSI	W/L	135	/	72	9
Robot programming	W/L	45	/	23	4
Group A+B combined:		**1245**	/	**680**	**91.5**
3D Scanning / Reverse Engineering	W/L	45	/	24	3
Signal measurement and analysis / DAQ systems	L	45	/	24	3
Robotization and automation / Digital models in industry	W/L	60	/	32	5
Optimization of construction / Application of CAD/CAE systems	W/L	45	/	23	4
Course group C total:		**195**	/	**103**	**15**
Total A+B+C		**1440**	/	**783**	**106,5**

* W – lecture, Ć – classes, L – laboratory classes, P – project, ZBN – self-taught classes

Table 3. A group of activities for the student's acquisition of engineering competence

A group of activities for the student's acquisition of engineering competence					
Course (name)	**Type(s) of the course***	**Number of instruction hours full-time/ part-time**			**Number of ECTS credits**
Chemistry	W/L	30	/	20	3
Mathematics	W/Ć	150	/	90	12
Engineering mechanics	W/C	90	/	50	7,5
Physics	W/Ć/L	90	/	56	8
Fluid mechanics	W/Ć/L	45	/	32	3
Strength of materials	W/Ć/L	90	/	45	6
Basics of Technical Thermodynamics	W/Ć/L	60	/	36	5
Environmental management and ecology	W	15	/	8	1
Work safety and ergonomics	W	15	/	8	1
Theory of machines	W	30	/	16	2
Fundamentals of engineering	W/L	45	/	23	4
Materials science	W/L	45	/	25	3
Design record	W/L	105	/	48	7
Metrology and measurement systems	W/L	45	/	28	3
Programming and numerical methods	C/P	60	/	32	4
Manufacturing Engineering	W/L	135	/	72	9
Electrical engineering and electronics	W/L	60	/	32	4
Basics of machine design	W/C/P	120	/	74	11
Machine dynamics	W/C/L	45	/	23	4
Mechatronics and Automatics	W/L	60	/	32	5
Mechanics of structures	W/C/L	75	/	40	6
Technology processes	W/P	45	/	24	3
Robotics	W/L	45	/	23	4
Artificial Intelligence	W/L	30	/	20	2
Industrial Controllers PLC	W/L	30	/	20	2
Simulations in Mechanics FEM+CFD+FSI	W/L	135	/	72	9
Technical diagnostics	W/L	60	/	32	5
Robot programming	W/L	45	/	23	4
Groups A+B combined:		**1800**	/	**1004**	137,5
3D Scanning / Reverse Engineering	W/L	45	/	24	3
ERP systems / Manufacturing Execution System	W/L	45	/	24	4
Signal measurement and analysis / DAQ systems	L	45	/	24	3
Computer aided design / Software packages in mechanics	W/L	105	/	56	9
Senior project	S	60	/	32	4
Programming of CNC machines / CAM systems	W/L	60	/	32	5
Robotization and automation / Digital models in industry	W/L	60	/	32	5
Internal combustion engines / Machine maintenance	W/L	60	/	32	5
Optimization of construction / Application of CAD/CAE systems	W/L	45	/	23	4
Course group C total:		**465**	/	**247**	**37**
Legal and economic aspects of entrepreneurship	W	30	/	20	3
Diploma Seminar	S	30	/	20	4
Preparation and submission of the thesis	ZBN	0	/	0	15
Course group D + E + F + H total:		**60**	/	**40**	**27**
Total A+B+C+D+E+F+H		**2325**	/	**1345**	**201,5**

* W – lecture, Ć – classes, L – laboratory classes, P – project, ZBN – self-taught classes

8 Practical placement

not applicable

9 Form of graduation

A prerequisite for graduation from the bachelor's degree programme in *Mechanical Engineering* and obtaining a diploma is obtaining the learning outcomes specified in the study programme, which are assigned 210 ECTS points, a positive evaluation of the diploma thesis, and passing the diploma exam with at least a satisfactory grade.

The thesis is an independent study of a practical issue presenting the student's general knowledge and skills related to the first degree studies in the field of *Mechanical Engineering* (general academic profile), as well as the ability to analyze and infer independently, and the ability to use modern tools supporting the work of an engineer, including computer techniques.

Diploma theses for full-time and part-time studies are subject to the same requirements. Students are provided with the choice of their topics - along with the indication of the supervisor - no later than two semesters before graduation.

The conditions for graduation and the rules for graduation in the bachelor's degree programme in *Mechanical Engineering,* are regulated by:

- University Regulations (*Regulamin Studiów Uniwersytetu Radomskiego*).
- Detailed rules for the organization of education Study Regulations (*Zasady Studiowania*) in the first-cycle studies in the field of *Mechanical Engineering*.
- Syllabus of the course "Preparation and submission of the thesis."
- Anti-plagiarism procedure for theses before they are allowed to be defended at *Casimir Pulavski University of Radom.*