The field of the study: **Mechanical engineering**
Educational level: **first - cycle studies**
Lovel of qualificationsi (PRK): **6**
Education profile: **general academic**
The field of engineering and technical sciences
Science discpiline: **mechanical engineering**

Course (name)

No.	Symbol of the field of study learning outcomes (EKK)	Study learning outcomes (KEU)	1 Mathematics	2 Physics	3 Chemistry	4 Engineering mechanics I	5 Strength of materials	6 Fluid mechanics	7 Fundamentals of Technical Thermodynamics	8 Engineering graphics	9 Materials science	10 Theory of machines	11 Environmental management and ecology	12 Work safety and ergonomics	13 Technologies of Industry 4.0	14 Experiment theory	15 3D CAD systems	16 Manufacturing engineering	17 Metrology and measurement systems	18 Electrical engineering and electronics	19 Finite element method I	20 Fundamentals of technical diagnostics	21 Transmission system design	22 Mechatronics and automatics	23 Machine construction technology	24 Fundamentals of machine design	25 Programming and numerical methods	26 Elective project
		KNOWLEDGE (W)																										
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;	1			1										1											1	
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;		1		1	1		1															1				
3	K_WG03	has the basic knowledge in the area of chemistry needed to understand and describe the phenomena occurring in the manufacture and operation of machine components;			1																							
4	K_WG04	knows and understands the principles of engineering graphics and the tools used in the preparation of technical documentation;								1							1				1		1					
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;		1		1																						
6	K_WG06	has knowledge in the area of strength analysis of basic mechanical structures;					1																1					
7	K_WG07	has an elementary knowledge of fluid mechanics and technical thermodynamics required to understand the construction and operation of mechanical, mechatronic or power equipment;						1	1																			
8	K_WG08	has elementary knowledge of electrical engineering, electronics, automatics, and computer science in applications in mechanics, mechatronics, or power engineering;		1																1				1				
9	K_WG09	knows and understands the principles of design of machine parts, mechanical structures and power equipment;																								1		1
10	K_WG10	knows and understands selected issues of mechanical engineering, operation, condition diagnosis, repair technology and safe operation;										1		1								1	1			1		
11	K_WG11	has knowledge of computer-aided design, manufacturing and operation of mechanical, mechatronic or power machines and equipment;								1							1						1	1			1	1
12	K_WG12	has a basic knowledge of metrology, knows and understands the methods of measurement of basic quantities characteris-tic of mechanical and equipment engineering, knows the calculation methods and computer tools necessary for the analysis of experimental results;		1	1				1										1					1				
13	K_WG13	has knowledge of engineering materials, their research and forming technologies;									1							1										
14	K_WG14	has basic knowledge of development trends in the area of design, manufacturing, construction and operation of machinery and equipment;													1											1		
15	K_WG15	has a basic knowledge of the life cycle of mechanical, mechatronic or power machinery and equipment;											1															
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;																							1			
17	K_WG17	has elementary knowledge of numerical methods used in simulation and analysis of mechanical systems, as well as in the process of their design, manufacturing and operation;																					1				1	
18	K_WG18	has basic knowledge of the basics of mechatronics, industrial mechatronics, automotive mechatronics, PLCs and industrial automatic control structures;																		1				1				
19	K_WG19	has basic knowledge of industrial sensors, automotive sensors, robotics, and the construction, programming and control of robots and manipulators;																		1				1				
20	K_WK20	knows the basic legal, economic, environmental and other non-technical conditions related to professional activity, including the development of individual entrepreneurship;											1	1														
21	K_WK21	has basic knowledge of management, including quality management, production management, logistics and conducting business activity;													1													
22	K_WK22	knows and understands the concepts and principles in the area of the protection of industrial property and copyright law.																										
23	K_WK23	understands the impact of social and civilization changes on the lifestyle of local, regional, national and world communities.													1													
		SKILLS (U)																										
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	1	1					1		1		1			1		1										
25	K_UW02	can use analytical, simulation and experimental methods to formulate and solve engineering tasks.		1		1	1	i	1							1					1		1	1			1	
26	K_UW03	is able to perceive their system and non-technical aspects when formulating and solving engineering tasks;																										
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;																										
28	K_UW05	is able to use computer methods in solving engineering tasks in the field of design, manufacturing and operation of ma-chinery and equipment;								1							1						1				1	1
29	K_UW06	can use measurement apparatus and methods of estimating measurement errors;		1	1			1	1									1	1	1								
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 op-eration of machinery and equipment;												1	1							1			1	1		
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;					1					1			1									1		1		
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;				1																1	1		1			1
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, tech-niques and tools;																						1				1
34	K_UW11	can select appropriate engineering materials for the correct operation of machinery and equipment;									1												1					
35	K_UW12	is able to use information and communication technologies appropriate for the performance of tasks in the design, manufacture and operation of machinery and equipment;		1						1																		1
36	K_UW13	can plan and conduct experiments, including measurements and computer simulations, interpret the results obtained and draw conclusions;			1			1					1															
37	K_UW14	is able to use relevant databases in the process of designing, manufacturing and operating machinery and equipment;								1		1					1											
38	K_UK15	can communicate using a variety of techniques in professional and other settings													1													
39	K_UK16	is able to prepare a study of problems of basic engineering issues in Polish, also in English or another foreign language recognized as the language of international communication;																					1				
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;																										
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;																										
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;											1															
43	K_UO20	is able to cooperate and act in a group, taking on different roles;	1	1	1															1								
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.	1	1		1					1		1		1			1										
		SOCIAL COMPETENCES (K)																										
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;		1		1				1		1				1		1		1			1		1			1
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;				1		1														1	1	1			1	
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;		1	1					1			1				1						1	1				
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;		1			1						1	1					1		1			1				
49	K_KO05	is willing to demonstrate entrepreneurship and ingenuity in activities related to the implementation of professional tasks;													1									1	1			
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;													1										1	1		
51	K_KR07	is aware of the importance of professional conduct, adherence to professional ethics and respect for diversity of views and cultures.							1																			

No.	Symbol	27 Kinematics and dynamics of multibody systems	28 Mechanics of structures	29 Mechanical vibration	30 Computer aided design	31 Finite element method II	32 Software packages in mechanics	33 3D printing	34 Computer Analysis of Structures	35 Numerical modeling of heat-flow problems	36 Industrial Controllers PLC	37 Senior project	38 Optimization of construction	39 Embedded systems	40 Numerical modeling of fluid-structure interaction	41 Application of CAD/CAE systems	42 ERP systems	43 System engineering	44 Industrial robots	45 Measurements and analysis of signals	46 Reverse engineering	47 Special technologies	48 Fundamentals of nanotechnology	49 Dimensional analysis of the construction	50 CNC machine tools	51 Machining by cutting and cutting tools	52 Measurement systems and uncertainty estimation
	KNOWLEDGE (W)																										
1	K_WG01	1		1			1			1			1		1	1		1									
2	K_WG02			1			1									1		1				1					
3	K_WG03																										
4	K_WG04				1	1																1					
5	K_WG05	1	1	1			1									1		1			1						
6	K_WG06		1						1				1						1								
7	K_WG07																										
8	K_WG08													1					1								
9	K_WG09							1				1							1								
10	K_WG10																		1								
11	K_WG11		1		1			1		1	1	1		1			1				1	1					
12	K_WG12																			1							1
13	K_WG13																					1	1			1	
14	K_WG14																					1	1		1		1
15	K_WG15										1									1							
16	K_WG16									1		1								1			1	1	1		
17	K_WG17	1		1			1			1		1	1		1	1		1	1	1					1		
18	K_WG18										1									1							
19	K_WG19										1			1					1	1							
20	K_WK20																										
21	K_WK21																1										
22	K_WK22																										
23	K_WK23																										
	SKILLS (U)																										
24	K_UW01	1																				1					
25	K_UW02	1	1			1				1									1					1			
26	K_UW03																										
27	K_UW04																					1					
28	K_UW05				1				1	1		1		1	1		1			1	1						1
29	K_UW06																			1							1
30	K_UW07																		1						1		
31	K_UW08			1			1						1			1		1	1								
32	K_UW09		1	1			1	1			1	1	1			1	1						1		1		
33	K_UW10		1									1							1		1	1	1				
34	K_UW11		1					1															1				
35	K_UW12							1			1	1					1										
36	K_UW13	1				1			1	1	1			1	1											1	
37	K_UW14		1	1	1																						
38	K_UK15																					1					
39	K_UK16			1			1						1			1		1									
40	K_UK17	1		1																							
41	K_UK18													1													
42	K_UO19						1						1			1		1									
43	K_UO20	1	1																				1			1	
44	K_UU21						1						1			1		1									
	SOCIAL COMPETENCES (K)																										
45	K_KK01			1			1				1	1	1	1		1		1	1				1	1			
46	K_KK02	1		1			1			1	1		1		1	1		1	1			1			1		
47	K_KO03		1		1																						1
48	K_KO04			1		1	1					1	1			1		1		1							
49	K_KO05	1						1													1	1					
50	K_KR06								1		1																
51	K_KR07						1						1			1		1									

No.	Symbol	53 Advanced solid modelling in CAD systems	54 Design of energy devices	55 Student project	56 Modern constructional materials	57 CAM systems	58 Theory of mechanisms and machines	59 Programming of CNC machine tools	60 Design of technological instrumentation	61 Design of technological processes of machine parts	62 Modelling and analysis of structures	63 Senior project	64 Surface engineering	65 Composite products technology	66 Methods of materials testing	67 Automation of manufacturing processes	68 Quality management systems	69 Machine construction	70 Tribology in machine engineering	71 The legal and economical aspects of entrepreneurship	72 Subjects in the humanities or social sciences	73 Protection of industrial property and copyright	74 Foreign language	75 Physical education	76 Apprenticeship	77 Diploma seminar	78 Preparation and submission of the diploma thesis
	KNOWLEDGE (W)																										
1	K_WG01									1							1										1
2	K_WG02		1																								1
3	K_WG03																										
4	K_WG04	1								1																	1
5	K_WG05																										
6	K_WG06				1																						1
7	K_WG07																										
8	K_WG08		1												1	1											
9	K_WG09		1				1			1		1						1								1	1
10	K_WG10																1									1	1
11	K_WG11	1								1	1	1														1	1
12	K_WG12																									1	
13	K_WG13				1								1	1												1	
14	K_WG14		1		1			1	1				1												1	1	1
15	K_WG15																									1	
16	K_WG16			1		1	1		1	1	1	1		1		1			1						1	1	1
17	K_WG17			1				1	1		1	1													1		
18	K_WG18																										
19	K_WG19																										
20	K_WK20																			1					1	1	1
21	K_WK21																										
22	K_WK22																					1				1	1
23	K_WK23																				1				1	1	
	SKILLS (U)																										
24	K_UW01				1												1									1	1
25	K_UW02				1		1				1				1	1	1								1	1	1
26	K_UW03																1									1	1
27	K_UW04																									1	1
28	K_UW05	1				1		1			1	1														1	1
29	K_UW06				1								1														
30	K_UW07								1										1								1
31	K_UW08						1				1														1	1	1
32	K_UW09		1	1					1	1	1	1				1	1	1	1							1	1
33	K_UW10		1	1				1				1			1			1								1	1
34	K_UW11		1		1					1				1													
35	K_UW12									1															1	1	1
36	K_UW13			1									1	1	1												1
37	K_UW14	1	1		1					1																1	1
38	K_UK15									1															1		
39	K_UK16																									1	1
40	K_UK17																						1		1	1	
41	K_UK18																						1		1	1	1
42	K_UO19																						1			1	
43	K_UO20		1	1																			1		1	1	
44	K_UU21																										1
	SOCIAL COMPETENCES (K)																										
45	K_KK01		1				1				1		1		1		1						1		1	1	
46	K_KK02				1	1			1	1				1		1		1							1	1	
47	K_KO03			1	1								1				1										
48	K_KO04	1						1		1		1							1								
49	K_KO05			1	1																				1		
50	K_KR06				1																						
51	K_KR07																										1