STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Engineering Mechanics		**1010401221010430041**
Field of study: **TECHNICAL PHYSICS**	Profile of study (general academic, practical): **(brak)**	Year /Semester: **1 / 2**
Elective path/specialty: **-**	Subject offered in: **Polish**	Course (compulsory, elective): **obligatory**
Cycle of study: **First-cycle studies**	Form of study (full-time,part-time): **full-time**	
No. of hours: Lecture: **2** Classes: **2** Laboratory: **-** Project/seminars: **-**		No. of credits: **4**
Status of the course in the study program (Basic, major, other): **(brak)**	(university-wide, from another field): **(brak)**	
Education areas and fields of science and art: **technical sciences** **Technical sciences**		ECTS distribution (number and %): **4 100%** **4 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	basic knowledge of the mechanics of the basic course in physics on the Technical Physics specialization, vector and tensor calculus, differential and integral calculus
2	**Skills**	ability to solve basic problems of mechanics based on their knowledge, ability to obtain information from the indicated sources
3	**Social competencies**	understanding of the need to expand their competences

Assumptions and objectives of the course:

-Provide students with general and detailed knowledge of engineering mechanics on the number of points within the range specified by the program contents appropriate to the field of study.

-Developing students' problem-solving skills of engineering mechanics based on the knowledge gained.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Able to define the physical concepts to the extent specified by the contents of engineering mechanics course program. - [K_W03, K_W07]

2. Able to formulate and explain the laws of engineering mechanics to the extent specified by the course program contents and to determine the extent of their applicability. - [K_W03, K_W07]

3. Can explain the general methods of calculation used to solve problems in the field of engineering mechanics. - [K_W03, K_W07]

Skills:

1. Can apply the laws and computational methods in engineering mechanics dealing with typical problems of program contents of studied subject. - [K_U01]

2. Can use with an understanding the indicated sources of knowledge (basic bibliography) and to acquire knowledge from other sources. - [K_U02]

Social competencies:

1. Can actively engage in solving the questions posed. - [K_K01,K_K08]

Assessment methods of study outcomes

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Effect of education	Type of evaluation	Evaluation criteria	
W03	written/oral exam	3	50.1%-70.0%
		4	70.1%-90.0%
		5	above 90.1%
W07	written/oral exam	3	50.1%-70.0%
		4	70.1%-90.0%
		5	above 90.1%
U01	test	3	50.1%-70.0%
		4	70.1%-90.0%
		5	above 90.1%
U02	test	3	50.1%-70.0%
		4	70.1%-90.0%
		5	above 90.1%
K01, K08	oral answers on the tutorials	(The student alone seeks a solution on the basis of acquired knowledge and show a strong commitment to solving problems - the student gets an extra score for the test result for any presentation of solution to the problem at the blackboard.)	

Course description

- Mathematical description of mechanical quantities

(vectors, tensors, differential vector operators)

- Kinematics

(index notation for kinematic parameters, natural coordinate system, curvilinear coordinate systems, description of the motion of material point and rigid body)

- Dynamics

(determination of the trajectory of material point using Newton's equations, the general definition of momentum, angular momentum and mechanical energy of a material point, principles of conservation in mechanics, field potential of forces, field potential of central forces, systems of material points and their mechanical description, static torque and center of mass, reduction of the forces acting on a rigid body, rigid body motion)

- Statics

(equation of equilibrium of forces acting on a rigid body, reaction forces, internal forces, pair of forces, converged systems of forces, unrestricted system of forces in one plane, spatial system of forces, the balance in rigid bodies systems, plane frames)

- Analytical mechanics

(constraints, degrees of freedom, generalized coordinates, possible, real and virtual shifts, virtual work, generalized forces, d'Alembert principle, the principle of virtual work, the second Lagrange equations)

Basic bibliography:

1. T. J. Hoffman, Podstawy mechaniki technicznej, Wydawnictwo Politechniki Poznańskiej, Poznań, 2000.

2. J. Leyko, Mechanika ogólna. Tom 1. Statyka i kinematyka, Tom 2. Dynamika, Wydawnictwo Naukowe PWN, Warszawa, 2011.

3. Zbiór zadań z mechaniki. Cz. 1. Statyka. Cz. 2. Kinematyka, Cz. 3. Dynamika, red.: J. Leyko, R. Kurowski, J. Szmeltera, PWN, Warszawa, 1970.

Additional bibliography:

1. I. I. Olchowski, Mechanika teoretyczna, Wydawnictwo Naukowe PWN, Warszawa, 1978.

2. W. Rubinowicz, W. Królikowski, Mechanika teoretyczna, Wydawnictwo Naukowe PWN, Warszawa, 1998.

3. E. Karaśkiewicz, Zarys teorii wektorów i tensorów, Wydawnictwo Naukowe PWN, Warszawa, 1971.

Result of average student's workload

Activity	Time (working hours)
1. Lecture	30
2. Tutorials	30
3. Consultation	4
4. Preparation for exam	16
5. Exam	2
6. Preparation for training	18

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Student's workload		
Source of workload	**hours**	**ECTS**
Total workload	120	4
Contact hours	66	3
Practical activities	34	1

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