STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Mechanics and Mechatronics**	Code **1010321231010214775**

Field of study **Electrical Engineering**	Profile of study (general academic, practical) **(brak)**	Year /Semester **2 / 3**

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: **-** Classes: **-** Laboratory: **-** Project/seminars: **1**	No. of credits **1**

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**	ECTS distribution (number and %**)** **1 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Knowledge of mechanics (the topics are specified in detail in the card intended to the module of mechanics and mechatronics for the second semester). Basic knowledge of calculus and vector calculus.
2	**Skills**	Ability of application of the fundamental laws of mechanics to solve mechanical problems appearing in electrical engineering. Skills of obtaining information based on various available sources.
3	**Social competencies**	The understanding of necessity of self development. Ability of working within a group.

Assumptions and objectives of the course:

Skills to description of equilibrium and motion of complex mechanical systems.

Preparing students for the design of complex material systems.

Improving the skills of engineering calculations.

Improving of personal and social skills to work within groups.

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

Knowledge:

1. Knowledge on: classical mechanics, electricity, thermodynamics, solid state physics, optics, nuclear physics, general relativity. - [K_W03, (T1A_W01)]

2. Determination of forces, moments and sresses in simple mechanical systems, equations of motion and elementary knowledge on mechatronics. - [-]

Skills:

1. Preparation of short presentation on an electical problem. - [K_U08, (T1A_U03, T1A_U04)]

2. Ability to make and formulate a specification of basic electrical systems and devices - [K_U16, (T1A_U14)]

3. Ability to assess fundamental methods and tools to solve simple engineering electrical problems. - [K_U22, (T1A_U15)]

Social competencies:

1. Student can understand the need and knows opportunities for learning throughout his life. He understands the necessity of permanent improvement his professional, personal and social skills. - [K_K01 ,(T1A_K01)]

Assessment methods of study outcomes

1. Evaluation on an ongoing basis during every classes - knowledge and skills, necessary to solve the problem, are evaluated.
2. Assessment for the description containing the methods used and the results obtained.

Course description

1. Basic rules of engineering calculations - the accuracy of calculations, rounding rules in accordance with the PN-70-N-02120. The use of systems for numerical computation and systems of computer algebra for engineering calculations (MatLab, Mathematica, http://www.wolframalpha.com).

2. The components and the coordinates of the vector - the unit vector, determining of the vector direction in space using angles, which it creates with axes and planes of the Cartesian coordinate system. Moment of force about the point and axis. The reaction forces, the free-body diagrams.

3. Equilibrium of concurrent force systems. Uniaxial stress state in rods axially loaded. The allowable stress. Design terms for the rods subjected to tension or compression. Hooke's law of elasticity. Determination of forces in rods of 3D truss and designing of the truss.

4. Equilibrium of arbitrary force systems. Designing of elements of the material system, subjected to tension or compression, due to the design term.

5. Coplanar force systems. Equilibrium of interacting bodies. Geometrical invariability of the material system - necessary and sufficient conditions.

Basic bibliography:

1. Mechanika ogólna, tom I i II, J. Leyko, PWN, Warszawa, 1996.

2. Mechanika techniczna, tom I i II, J. Misiak, WNT, Warszawa, 1996.

3. Engineering Mechanics, D.J. McGill, PWS Publishers, Boston, 1985.

4. Zadania z mechaniki ogólnej tom I i II, J. Misiak, WNT, Warszawa, 2009.

Additional bibliography:

1. Metodyka rozwiązywania zadań z mechaniki, J. Nizioł, WNT, Warszawa, 2007.

2. Zbiór zadań z mechaniki ogólnej, M. T. Niezgodzińscy, PWN, Warszawa, 2009.

3. Mechanika klasyczna, analityczna i Mathematica w zadaniach i przykładach obliczeniowych, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2003.

Result of average student's workload

Activity	Time (working hours)
1. participation in project classes	15
2. time spent to prepare for classes	3
3. part in the consultation on the design tasks	3
4. performance of the tasks foreseen in the project (own work)	12
5. time spent to prepare for the test	8

Student's workload

Source of workload	hours	ECTS
Total workload	41	1
Contact hours	18	1
Practical activities	27	0