STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Mechanism Theory**		Code **1010401141010210548**

Field of study **EDUCATION IN TECHNOLOGY AND**	Profile of study (general academic, practical) **(brak)**	Year /Semester **2 / 4**

Elective path/specialty **-**	Subject offered in: **Polish**	Course (compulsory, elective) **elective**

Cycle of study: **First-cycle studies**	Form of study (full-time, part-time) **full-time**

No. of hours				No. of credits
Lecture: **1** Classes: **-** Laboratory: **-** Project/seminars: **-**				**2**

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 %**)** **2 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Basic knowledge of physics on the level of studies of the first degree and knowledge of mechanics comprising statics, kinematics of material point, rotational motion, planar notion, dynamics of rotational and planar motions.
		Deep knowledge of the advanced mathematics comprising algebra, trigonometry, vectors, differential and integral calculus necessary to describe phenomena accompanying work of machines..
		Knowledge of basic computer tools and numerical methods enabling performing numerical experiment.
		General knowledge of mechanical engineering
2	**Skills**	Skills to solve problems of mechanics on the basis of ones knowledge, to extract information from the literature, databases and other properly selected sources
3	**Social competencies**	Understanding of necessity to widen ones competences.

Assumptions and objectives of the course:

Acquisition of knowledge on mechanism theory to solve problems related to design, action and exploitation of machines

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

Knowledge:

1. to explain the meaning of structural analysis of mechanisms, apply physical laws to describe and analyze motion of mechanisms, formulate principles of motion and forces transmission, carry out analysis of machine motion under action of forces - [T1A_W01 T1A_W02 T1A_W04]

2. to explain limitations of simplified mathematical models describing actions of machines and point out their effects, carry out critical analysis of theoretical calculations - [T1A_W01 T1A_W02]

3. to use computer software which add kinematic and dynamic analysis of mechanical systems - [T1A_W07]

4. to point out current studies on development of mechanism theory - [T1A_W05]

5. to apply scientific method in solving engineering problems related to design and exploitation of machines, to adapt methods of mechanism theory to related scientific fields - [T1A_W03]

Skills:

1. to extract information from the literature, databases and other properly selected sources, ability to reconstruct reasoning described in literature regarding taken assumptions and simplifications - [T1A_U01 T1A_U05]

2. to present results in written and oral form - [T1A_U03 T1A_U04]

3. to communicate effectively with specialists as well as with non specialists in field of engineering - [T1A_U02]

4. to specify ways of further acquisition of knowledge and skills in file of mechanism theory - [T1A_U05]

5. to exploit relevant analytical and numerical methods formulate and solve engineering problems - [T1A_U09]

Social competencies:

1. . is aware of importance of each subject in learning all aspects of engineering knowledge and its importance in professional activity - [T1A_K01]

2. understands the need of life-long learning - [T1A_K01]

3. appreciates the importance of intellectual honesty in actions of ones own and others, is aware of ethic aspects in scientific activity - [T1A_K02]

4. understands needs to present knowledge on mechanical engineering related to structure and action of machines including the latest scientific achievements in commonly understandable way - [T1A_K01,T1A_K07]

5. . is careful in getting information from unverified sources including internet - [T1A_K01]

6. is aware of the necessity to apply technical solutions of the lowest energy consumption which meet all other design criteria - [T1A_K02]

7. is aware of importance of experiment in verification of theoretical results - [T1A_K01]

Assessment methods of study outcomes

Colloquium, colloquium written on the last lecture, the scope: four problems + two theoretical questions, criteria of assesment 3.0 (50%-70%), 4.0 (71%-90%), 5.0 (>90%).

Course description

Structure of mechanisms Basic definitions.

Classification of kinematic pairs.

Structural and functional classification of mechanisms.

Kinematics of mechanisms.

Mobility of mechanisms.

Analytical methods of kinematic analysis of lever mechanisms: four-bar linkage, slider-crank mechanism.

Total compensating torque.

Balancing of planar mechanisms.

Selection of flywheel.

Basic bibliography:

1. J. J. Uicker, G. R. Pennock, J. E. Shigley, Theory of Machines and Mechanisms, Oxford University Press, New York, 2003.

2. Morecki A.; Knapczyk J., Kędzior J., Mechanism and manipulators theory.WNT, Warsaw, 2001

3. A.G. Erdman, G.N. Sandor, & S. Kota. Mechanism Design: Analysis & Synthesis. 4th Ed. (Web Enhanced), Volume I, Prentice-Hall, 2001

Additional bibliography:

1. H. H. Mabie, F. W. Ocvirk, Mechanisms and Dynamics of Machinery, John Wiley & Sons, 1975

Result of average student's workload

Activity	Time (working hours)
1. Lecture	15
2. Classes	15
3. Consultation	10
4. Preparation for the next classes	1
5. Preparation for the colloquium	5

Student's workload

Source of workload	hours	ECTS
Total workload	46	2
Contact hours	40	2

Practical activities	15	1