POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

pl. M. Skłodowskiej-Curie 5, 60-965 Poznań

COURSE DESCRIPTION CARD - SYLLABUS

Course name
Technical Mechanics II

	Course
Field of study	Year/Semester
Mechanical and Automotive Engineering	**2/3**
Area of study (specialization)	Profile of study
	general academic
Level of study	Course offered in
First-cycle studies	**polish**
Form of study	Requirements
full-time	**compulsory**

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
15	0	
Tutorials	Projects/seminars	
15	0	

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

dr hab. inż. Maciej Tabaszewski

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tel. 6652390

Faculty of Mechanical Engeenering

ul. Piotrowo 3 60-965 Poznań

Prerequisites

Basic knowledge of mathematics in the field of vector, differential and integral calculus as well as engineering mechanics mechanics in the field of statics and kinematics

The ability to think logically and creatively, to use internet and library resources

The student understands the need for continuous learning and gaining new knowledge

Course objective

Expanding students' knowledge of dynamics. Obtaining theoretical knowledge and practical skills

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necessary to study mechanics of materials in terms of dynamic loads, basics of machine construction, machine dynamics and the theory of mechanical vibrations.

Course-related learning outcomes

Knowledge

Has knowledge in the field of mathematics, including algebra, analysis, theory of differential equations, probability, analytical geometry necessary to: describe the operation of discrete mechanical systems, understand computer graphics methods, describe the operation of electrical and mechatronic systems.

Has ordered basic knowledge of the main divisions of technical mechanics: statics, kinematics and dynamics of a material point and a rigid body.

Has basic knowledge of the basics of machine design and the theory of machines and mechanisms, including mechanical vibrations.

Skills

Can obtain information from literature, the Internet, databases and other sources. Can integrate the obtained information, interpret and draw conclusions from it, and create and justify opinions.

Can use learned mathematical theories to create and analyze simple mathematical models of machines and their elements, and simple technical systems.

Can competently advise on the selection of a machine for a given application in the industry covered by the selected diploma path based on the acquired knowledge about a given group of machines.

Social competences

Is ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in case of difficulties in solving the problem on his own.

Is willing to think and act in an entrepreneurial manner.

Is ready to fulfill professional roles responsibly, including:

 - observing the rules of professional ethics and requiring this from others,

- caring for the achievements and traditions of the profession.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Passing the lecture on the basis of an written exam

Passing exercises on the basis of systematic tests

Programme content

Two basic problems of dynamics. D'Alembert's principle. Moments of inertia. Vibrations of a one degree of freedom system . Work, power, kinetic and potential energy. Theorems of conservation. Theorem of kinectic energy and work. Dynamics of relative point motion. The momentum of a point, system of

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points and a rigid body. Angular momentum of material point and rigid body. The principle of momentum, the principle of conservation of momentum. Dynamics of the rigid body. Center of mass motion. Dynamic reactions of the fixed axis of rotation. Reduction of the moment of inertia in rotational motion. Movement of a system with variable mass. Lagrange equation of the second kind.

Teaching methods

Lectures: multimedia presentation with theory and examples

Classes: problem solving

Bibliography

Basic

1.	Sałata W., Mechanika ogólna w zarysie, Poznań, Wyd. PP 1998.

2.	Leyko J., Mechanika ogólna. T. 2, Warszawa, PWN 2008.

3.	Misiak J., Mechanika ogólna. T. II , Warszawa, WNT 1995.

4.	Misiak J. Zadania z mechaniki ogólnej. Część III, Warszawa, WNT 1994.

5.	Nizioł J. Metodyka rozwiązywania zadań z mechaniki. Warszawa, WNT 2002.

6.	Mieszczerski I. W., Zbiór zadań z mechaniki. Warszawa, PWN 1969.

Additional

1. Osiński Z. Mechanika ogólna. Warszawa, PWN 2000.

2. Awrajcewicz J. Mechanika techniczna, Warszawa WNT 2009

3. Arczewski K. Drgania układów fizycznych, Warszawa, Wyd. PW. 2008

4. Szcześniak W. Dynamika teoretyczna w zadaniach dla dociekliwych, Warszawa, Wyd. PW.

 2010

Breakdown of average student's workload

	Hours	ECTS
Total workload	70	3,0
Classes requiring direct contact with the teacher	30	1,5
Student's own work (literature studies, preparation for classes, preparation for tests) [1]	40	1,5

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[1] delete or add other activities as appropriate