



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Mechanics

Course

Field of study

Mechatronics

Area of study (specialization)

-

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

2/3

Profile of study

general academic

Course offered in

Polish

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

0

Tutorials

15

Projects/seminars

0

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

dr hab. inż. Jacek Buśkiewicz

Responsible for the course/lecturer:

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Institute of Applied Mechanics

Faculty of Mechanical Engineering

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Prerequisites

General knowledge on physics. Knowledge of mathematics including algebra, trigonometry, vectors, derivatives, integrals.

Course objective

To obtain the ability to mechanically describe motion of material systems and structures. To prepare for mechanical analysis of complex mechanical system.



Course-related learning outcomes

Knowledge

1. To define basic mechanical terms and give practical examples of mechanical systems.
2. A knowledge of dynamics which enables to formulate equations of motions of a point and system of points as well as of rigid body using dynamical laws and theorem.
3. To formulate basic terms and explain fundamental physical laws, mechanical theorems. To formulate the limitations and the extent of applicability in physical phenomena modelling.
4. To explain the importance of simplified mechanical models.

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.
2. To exploit relevant analytical methods formulate and solve simple engineering problems.
3. To communicate effectively with specialists as well as with non-specialists in the field of engineering.
4. To specify ways of further acquisition of knowledge and skills in field of mechanics.

Social competences

1. The student understands the need of life-long learning, of inspiring and organising other person's teaching process.
2. Is aware of importance of basic engineering knowledge and its importance in solving simple engineering problems.
3. Understands the need for popularisation of knowledge of mechanical engineering.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Practice: colloquiums: criteria of assessment 3.0 (50%-70%), 4.0 (71%-90%), 5.0 (>90%).

Lecture: theoretical test: criteria of assessment 3.0 (50%-70%), 4.0 (71%-90%), 5.0 (>90%).

Laboratory classes: computer and adequate software.

Programme content

Dynamics:

1. Mass geometry.
2. Newton's laws. Dynamics of point in Cartesian and natural coordinate systems.
3. Dynamics of rigid body in translational, rotational and planar motions.



4. Mechanical work and power. Potential force.
5. Mechanical energy, theorem of mechanical energy conservation, principle of the equivalence of work and kinetic energy.

Teaching methods

1. Lecture: the presentation illustrated with examples and problems solutions written down on the blackboard.
2. Practice (tutorials): the problems solved by students and a lecturer, discussion on different concepts of solutions.
3. Laboratory classes: computer laboratory and adequate software for implementing and solving complex problems.

Bibliography

Basic

1. Mechanics. In polish: Mechanika ogólna, tom I i II, J. Leyko, PWN, Warszawa, 1996
2. Mechanics. In polish: Mechanika techniczna, tom I i II, J. Misiak, WNT, Warszawa, 1996
3. Engineering Mechanics, D.J. McGill, PWS Publishers, Boston, 1985
4. Analytical Mechanics for Engineers, F.B. Seely, N.E. Ensigh P.G. Jones, Wiley, New York, 1958

Additional

1. Problems on mechanics. In polish: Zadania z mechaniki ogólnej tom I i II, J. Misiak, WNT, Warszawa, 2009
2. Methodology of solving theoretical mechanics problems. In polish: Metodyka rozwiązywania zadań z mechaniki, J. Nizioł, WNT, Warszawa, 2007
3. Problems on mechanics. In polish: Zbiór zadań z mechaniki ogólnej, M. T. Niezgodziński, Wydawnictwo Naukowe PWN, Warszawa, 2009

Breakdown of average student's workload

	Hours	ECTS
Total workload	100	4,0
Classes requiring direct contact with the teacher	45	2,0
Student's own work (literature studies, preparation for classes, preparation for tests and exam, preparation for computer laboratories) ¹	55	2,0

¹ delete or add other activities as appropriate