



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Technical mechanics

Course

Field of study

Aviation

Area of study (specialization)

Level of study

First-cycle studies

Form of study

full-time

Year/Semester

1/2

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

Other (e.g. online)

Tutorials

30

Projects/seminars

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

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Wydział Inżynierii Mechanicznej

ul. Piotrowo 3 60-965 Poznań

Responsible for the course/lecturer:

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Wydział Inżynierii Mechanicznej

ul. Piotrowo 3 60-965 Poznań

Prerequisites

Basic knowledge of mechanics and mathematics, vector calculus, calculus, integrals, ordinary differential equations. Logical thinking, use of the Internet and the library, the use of computer calculation programs.

Course objective

Providing students with basic knowledge of mechanics, in the field of statics, kinematics and dynamics, which will enable him to study further subjects in the field of material strength, fundamentals of machine construction, vibrations, machine dynamics, machine theory and mechanisms, etc.



Course-related learning outcomes

Knowledge

1. has extended knowledge in the field of material strength, including the theory of elasticity and plasticity, stress hypotheses, methods of calculating beams, membranes, shafts, joints and other structural elements, as well as methods of testing the strength of materials and the state of deformation and stress in structures, and has basic knowledge of the main departments of technical mechanics: statics, kinematics and dynamics of a material point and a rigid body

Skills

1. can analyze objects and technical solutions, can search in catalogs and on manufacturers' websites, ready components of machines and devices, including means and devices, assess their suitability for use in their own technical and organizational projects

2. can use the mathematics (differential and integral calculus) to describe simple engineering problems

Social competences

1. is aware of the social role of a technical university graduate, in particular understands the need to formulate and provide the society, in an appropriate form, with information and opinions on engineering activities, technological achievements, as well as the achievements and traditions of the engineer profession

2. correctly identifies and resolves dilemmas related to the profession of an aerospace engineer

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture: written test verifying proper understanding of the concepts of technical mechanics. Issues of theory will be delivered to the students via university email

Exercises: tests and assessment activities in the classroom

Programme content

Elements of vector algebra. Statics including: axioms of statics, theorem of three forces, equilibrium equations for various force systems (concurrent, parallel, 2 and 3 dimensional), moment of force, resultant of two parallel forces, pair of forces, reduction of any set of loading, change of the reduction pole, invariants of the reduction, concentrated and distributed loads, trusses, frames, friction, belt friction.

Kinematics including: kinematics of point, velocity, acceleration, description of motion in the absolute coordinate system (Cartesian and polar) and in the natural coordinate system, tangent and normal acceleration, kinematics of rigid body, various kinds of motion (translation, rotation, planar, spherical, general), complex motion of a point

PART - 66 (THEORY - 33.75 hours)

MODULE 2. PHYSICS



2.2 Mechanics

2.2.2 Kinetics

Linear motion: uniform motion in a straight line, motion with constant acceleration (movement under force gravity); Rotation: uniform rotation (centrifugal/centrifugal force); [2]

Teaching methods

Lectures: multimedia presentation, illustrated by the examples on the blackboard

Tutorials: solving exemplar problems on blackboard

Bibliography

Basic

1. J.Leyko, Mechanika ogólna, tom I i II, PWN, Warszawa, 2008
2. J.Misiak, Mechanika techniczna, tom I i II, WNT, Warszawa, 1996
3. M.Łunc, A.Szaniawski, Zarys mechaniki ogólnej, PWN, Warszawa, 1959
4. J.Misiak, Zadania z mechaniki ogólnej, Część I, II i III, Warszawa, WNT 2009
5. J.Nizioł, Metodyka rozwiązywania zadań z mechaniki, Warszawa, WNT 2007

Additional

1. A.Bedford, W.Fowler, Engineering mechanics, Prentice Hall, New Jersey, 2002
2. D.J.McGill, Engineering Mechanics, PWS Publishers, Boston, 1985
3. J.Awrejcewicz, Mechanika techniczna, Warszawa WNT 2009
4. M.T.Niezgodziński, Zbiór zadań z mechaniki ogólnej, Wydawnictwo Naukowe PWN, Warszawa, 2009

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	47	2,0
Student's own work (literature studies, preparation for tutorials, preparation for tests) ¹	28	1,0

¹ delete or add other activities as appropriate