



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Basics of Machine Design

Course

Field of study

Aviation

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

elective

Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

Tutorials

15

Projects/seminars

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

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Responsible for the course/lecturer:

Prerequisites

The student has knowledge of physics (mechanics in the field of: statics, kinematics and dynamics), mathematics, basics of machine design after passing as part of the study program.

The student has the ability to solve problems based on their knowledge (basics of machine design, mechanics, mathematics, materials science, strength of materials) and the ability to obtain information from indicated sources.

The student understands the need to expand their competences, shows readiness to cooperate within a team.



Course objective

1. Providing students with knowledge of the basics of machine construction, to the extent specified by the curriculum content appropriate to the field of study.
2. Developing students' skills:
 - calculating and constructing machine components and assemblies,
 - documenting and reading technical documentation based on knowledge gained in the subject of machine engineering graphics,
 - practical use of knowledge gained in the subjects: mechanics, strength of materials, machine science, material science.

Course-related learning outcomes

Knowledge

1. has an ordered, theoretically founded knowledge in the field of engineering graphics and machine construction: technical drawing, object projection, basic principles of engineering graphics, the use of CAD (Computer Aided Design) graphic programs in the construction of machines
2. 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. is able to obtain information from various sources, including literature and databases, both in Polish and in English, integrate them properly, interpret them and make a critical evaluation, draw conclusions and exhaustively justify the opinions they formulate
2. can solve tasks using the rules of air traffic and design a runway in accordance with the applicable ICAO requirements
3. is able to properly select materials for simple aviation structures, and can indicate the differences between the fuels used in aviation

Social competences

1. understands that in technology, knowledge and skills very quickly become obsolete
2. is able to think and act in an entrepreneurial way, incl. finding commercial applications for the created system, bearing in mind not only the business benefits, but also the social benefits of the activity
3. 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



Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Passing a self-made project.

Programme content

Basic principles of the construction process, elements of the mechanism, characteristics of load types, definition of loads and formulation of appropriate strength conditions. Screw mechanisms: examples and applications, structural calculations.

PART - 66 (THEORY - 11.25 hours)

MODULE 6. MATERIALS AND EQUIPMENT

6.9 Gearbox

Types of gears and their application;

Gear ratios, reduction and multiplication systems, passive and active gears, tooth patterns;

Belts and pulleys, chains and sprocket teeth. [2]

MODULE 7A. MAINTENANCE ACTIVITIES

7.15 Welding, brazing, soldering and bonding

a) Soldering methods, testing of soldered joints. [2]

b) Welding and brazing methods;

Examination of welded and brazed joints;

Joining methods and testing of glued joints. [2]

Teaching methods

Presentation illustrated with sample projects.

Bibliography

Basic

1. Praca zbiorowa pod red. Z. Osińskiego, Podstawy konstrukcji maszyn, PWN, W-wa, 1999
2. Praca zbiorowa pod red. M. Dietricha: Podstawy konstrukcji maszyn. Tom 3, WNT, Wa-wa, 1999.
3. Osiński Zbigniew, Sprzęgła, PWN, Warszawa 1998
4. Dziama A., Michniewicz M., Niedźwiedzki A.: Przekładnie zębate. PWN, Wa-wa, 1989.
5. Ochęduszko K.: Koła zębate, WNT 1985.



6. Dudziak M.: Przekładnie ciągłowe. PWN, Warszawa, 1997.

Additional

1. Niemann G., Maschinenelemente t. I, II, III, Springer, Verlag Berlin, 1965

2. Müller L., Przekładnie obiegowe, PWN, Warszawa, 1983

3. Bahl G., Beitz W., Nauka konstruowania, WNT, Warszawa 1984

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 project classes, project implementation) ¹	55	2,0

¹ delete or add other activities as appropriate