



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Basics of drive systems design

Course

Field of study

Construction and exploitation of means of transport

Area of study (specialization)

Level of study

First-cycle studies

Form of study

part-time

Year/Semester

3/5

Profile of study

general academic

Course offered in

polish

Requirements

compulsory

Number of hours

Lecture

18

Laboratory classes

0

Other (e.g. online)

0

Tutorials

8

Projects/seminars

18

Number of credit points

6

Lecturers

Responsible for the course/lecturer:

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Faculty of Mechanical Engineering

Piotrowo 3 Street, 61-138 Poznań

Responsible for the course/lecturer:

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Faculty of Mechanical Engineering

Piotrowo 3 Steet, 61-138 Poznań

Prerequisites

Student has knowledge of physics (statics, kinematics and dynamics), mathematics, Basic of machines design I after completing the program of study. Student has the problem-solving skills of the basics of machine design based on their knowledge, ability to obtain the information from identified sources. Student understands the need to broaden their competence, willingness to work together as a team.

Course objective

1. Provide students with knowledge of the basics of machine design.
2. Develop students' skills:
 - calculation and design of components and assemblies of machines,



- making and reading the technical documentation on the basis of the knowledge from the Engineering Drawing course

- practical use of the knowledge gained from the course: Mechanics, Strength of materials, Theory of machines, Materials, Basics of Machines Design I.

3. Development of students' teamwork skills.

Course-related learning outcomes

Knowledge

1. Has basic knowledge of the basics of machine construction and the theory of machines and mechanisms, including mechanical vibrations .
2. Has basic knowledge of standardized principles of construction record and engineering graphics.
3. Has basic knowledge in the field of strength of materials, including the basis of the theory of elasticity and plasticity, performance hypotheses, methods for calculating beams, membranes, shafts, connections and other simple structural elements, as well as methods for testing the strength of materials and the state of strain and stress in mechanical constructions.

Skills

1. Is able to plan and carry out the process of constructing uncomplicated machine sets or machines and to formulate requirements for electronic components and automatic control systems for industry professionals in mechatronic systems.
2. Student is able to perform basic functional and strength calculations of machine elements such as tension, cogged, friction gears, bearings, rolling and sliding gears, couplings, brakes.
3. He can prepare technical documentation descriptively - drawing engineering tasks.

Social competences

1. Is ready to critically evaluate your knowledge and content you receive.
2. Is ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in the event of difficulties in solving the problem.
3. Is ready to fulfill professional roles responsibly, including:
 - compliance with the rules of professional ethics and requiring this from others,
 - care for the achievements and traditions of the profession.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Written exam of the lecture, completion of exercises and project execution.

Programme content



The structure of the machine drive system, the functions of transmission, clutch, the basic parameters of the drive, drive types, kinematic diagrams. Split couplings, design review and applications. Starting layout drive with clutch. Clutch: fixed, controlled, sensitive, overload. Calculation of couplings and the rules for the selection. The general division of drives, design review, the basic parameters. Rules for selection of gear ratios and the calculation of torques. Gears: classification, the outline of the teeth. Helical gear: geometry, kinematics. wheels, interdental force, the base of the structure. Bevel gear, the geometric parameters of the wheels, interdental force. State of stress in the gear wheel teeth. Design calculations of spur gear. Worm gears, geometry, kinematics. Planetary Gear, examples of construction. General characteristics of belt drives, power and tension in the belt cords, power and gear efficiency. The calculation and selection of the design characteristics of belt drives. Chain drives. Power screw assemblies.

Teaching methods

Information lecture, exercise method, project method.

Bibliography

Basic

1. J. Żółtowski, Podstawy Konstrukcji Maszyn, Oficyna Wydawnicza Politechniki Warszawskiej, 2002.
2. R. Knosala, A. Gwiazda, A. Baier, P. Gendarz, Podstawy Konstrukcji Maszyn, WNT, Warszawa 2000.
3. A. Dziurski, L. Kania, A. Kasprzycki, E. Mazanek, Przykłady obliczeń z Podstawy Konstrukcji Maszyn, Tom 1 i 2, WNT, Warszawa 2005.

Additional

1. Dietrich M., Podstawy konstrukcji maszyn, Wydawnictwo Naukowo Techniczne 1995.
2. Niezgodziński M. E., Niezgodziński T., Wzory, wykresy i tablice wytrzymałościowe, Wydawnictwo Naukowo Techniczne, 1996,
3. Sempruch J., Piątkowski T., Podstawy konstrukcji maszyn z CAD, Piła, Państwowa Wyższa Szkoła Zawodowa w Pile, 2006

Breakdown of average student's workload

	Hours	ECTS
Total workload	150	6,0
Classes requiring direct contact with the teacher	50	2,0
Student's own work (literature studies, preparation for exam, preparation for project classes) ¹	100	4,0

¹ delete or add other activities as appropriate