COURSE DESCRIPTION CARD - SYLLABUS

Course name

Mechanical Engineering Design

Course

Field of study

Management and Production Engineering

Area of study (specialization)

-

Level of study

First-cycle studies

Form of study

part-time

Year/Semester

3 / 6

Profile of study

practical

Course offered in

Polish

Requirements

compulsory

Number of hours

Lecture

0

Laboratory classes

0

Other (e.g. online)

0

Tutorials

0

Projects/seminars

12

Number of credit points

1

Lecturers

Responsible for the course/lecturer:

PhD Maciej OBST

email: maciej.obst@put.poznan.pl

ph. +48 61 665 22 68

Faculty of Mechanical Engineering

Centre of Mechatronics, Biomechanics and Nanoengineering

Jana Pawła II 24, 60-965 Poznań, room 405

Responsible for the course/lecturer:

-

Prerequisites

Beginner student of Mechanical Engineering Design course should have mechanics, mathematics, physics and strength of materials knowledge. The student should have also creative thinking skills, should be able to find and obtain useful information from source materials, should also be ready to cooperate as student's team member.

Course objective

Learning the practical application of the principles of machine design. Getting to know the problems typical of the construction process and the practice of the constructor's work. Learning to make decisions, solve technical problems and learn to work as a team member. Acquiring skills to use machine standards, producer's catalogs and the ability to correctly develop a mechanical project.

Course-related learning outcomes

Knowledge

The student getting knowledge about the basics of mechanical systems modeling, principles of operation and design of connections in mechanical engineering, bearings, clutchesm shafts and axles, basics of machine exploitation, principles of operation of mechanical gears and design methods, modern research methods used in the process of machine and structure design, principles of operation of flexible mechanical elements and design methods, basis of dynamic loads in mechanical systems. The student also gains knowledge about the practical approach to the problem of material fatigue and safety factors chosing.

Skills

The student has the ability to design machine mechanical connections, is able to use catalogs and industry standards, is able to design bearing nodes and basic mechanical constructions. The implementation of the shaft design includes dedicated calculations, selection of bearings, check calculations, fatigue calculations, design of shaft spline and splines connections, selection of seals and shaft technological parameters. The student has the ability to prepare technical documentation - executive and assembly documentation.

The Student have ability to think creatively and learn independently.

Social competences

Understanding the need for lifelong learning.

Understanding the social effects of engineering activities.

Understanding the need for team cooperation.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Knowledge and skills acquired as part of the project classes will be systematically verified during meetings. During the last class in the semester there will be a discussion to act as a defense of the self-made project.

Programme content

Preparation of the design of propulsion system subassembly – shaft design. The design includes determining the loads on the designed shaft, determination of the theoretical shaft outline, carrying out verification calculations, assessment of the stiffness of the designed shaft, selection of bearings, designing shaft journals and free segments, calculation of key or spline connections, design of bearings mounting seat, design of the spacer sleeve and methods of seating parts on the shaft. The selection of seals is also part of the project and checking calculations of the fatigue strength of the shaft are performing. The final stage is the preparation of the report with technical documentation.

Teaching methods

Project: solving practical problems, searching for sources of knowledge, teamwork, discussion

Bibliography

Basic

1. Magnucki K., Jasion P.: Podstawy konstrukcji maszyn. Wydawnictwo Politechniki Poznańskiej, 2016

2. Mazanek E. (red.), "Przykłady obliczeń z podstaw konstrukcji maszyn" Warszawa, WNT, 2012

3. Osiński Z., "Podstawy konstrukcji maszyn". Warszawa, Wyd. Naukowe PWN, 2002

Additional

1. Bąk R., Burczyński T., "Wytrzymałość materiałów z elementami ujęcia komputerowego" WNT, 2013

2. Beitz P., "Nauka konstruowania" WNT, 1984

3. Cannon jr. R.H., "Dynamika układów fizycznych" WNT, 1973

Breakdown of average student's workload

	Hours	ECTS
Total workload	25	1
Classes requiring direct contact with the teacher	12	0,5
Student's own work (literature studies, preparation for tutorials, preparation for tests/exam, project preparation) [1]	13	0,5

[1] delete or add other activities as appropriate