



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Product Design Systems 1

Course

Field of study

Product Lifecycle Engineering

Area of study (specialization)

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

1/1

Profile of study

general academic

Course offered in

English

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

30

Other (e.g. online)

Tutorials

Projects/seminars

Number of credit points

4

Lecturers

Responsible for the course/lecturer:

PhD Eng. Przemysław Zawadzki

Responsible for the course/lecturer:

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Faculty of Mechanical Engineering

Piotrowo Street No 3, 60-965 Poznań

Prerequisites

The student has basic knowledge in the field of engineering graphics and information technology, as well as in the area of designing technological processes and the importance of using CAx systems in the product development process. In addition, at the basic level student knows at least one CAD program, the basics of 3D modeling and preparation of 2D documentation.

Course objective

The aim of the course is to acquaint students with the possibilities of using advanced CAx computer engineering systems to support the design and manufacture of products in a manufacturing company.

Course-related learning outcomes

Knowledge



1. Describes engineering software systems to support the technical preparation of product production in the enterprise
2. Describes 3D geometric modeling methods, model visualization methods and procedures for using models for virtual product testing and manufacturing planning

Skills

1. Student creates a 3D geometric model of a single part and assembly model
2. Student develops programs for CNC machines, using the CAM module in the integrated CAx system
3. Student performs numerical analysis of structures and kinematic analysis of mechanisms using packages of integrated CAx system

Social competences

1. Student is open to the implementation of information technologies in engineering activities
2. Student is able to independently develop knowledge in the subject
3. Student is able to work in a design team using computer systems supporting engineering work

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

In the field of lectures - test - questions regarding materials discussed during lectures.

In the field of laboratory classes - final test in the scope of materials discussed in the classes.

Programme content

Lectures:

- The role of CAx computer systems in product preparation for production process (in the design and technology department of the enterprise).
- The use of integrated CAx systems in product design and development.
- The use of CAx systems in additive manufacturing processes.
- CAE tools in numerical analysis and simulation of kinematic mechanisms.
- Programming of CNC machines in the CAM system.

Laboratory classes:

- Solid modeling methods in CAD system.
- Design for additive manufacturing .



- Computer simulations (CAE) - kinematic analysis & Finite Element Methods (FEA).
- Milling design in the CAM program.

Teaching methods

- word-based methods - lecture,
- methods based on practical activities - exercises,
- acquisition methods - independent student's work, consultations, discussion.

Bibliography

Basic

Amit Vaidya, "CIM - A CAD, CAM, CAE Approach in Economical Tractor Manufacturing ", LAP LAMBERT Academic Publishing (August 23, 2019), ISBN-10 : 6200288496, ISBN 13: 9786200288493

Kunwoo Lee, "Principles of CAD/CAM/CAE", Addison-Wesley Longman Publishing Co., Inc., 75 Arlington Street, Suite 300 Boston, MA United States, ISBN:978-0-201-38036-1

Additional

Sham Tickoo, "Autodesk Inventor Professional 2018 for Designers", CAD/CIM Technologies; 18th Edition (July 11, 2017), ISBN-10 : 1942689888

Sham Tickoo, "CATIA V5-6R2019 for Designers, 17th Edition", CAD/CIM Technologies (January 2, 2020), ISBN-10 : 1640570861

Breakdown of average student's workload

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

¹ delete or add other activities as appropriate