COURSE DESCRIPTION CARD - SYLLABUS

Course name
Systems CAD/CAM

Course

Field of study
Mechanical Engineering
Area of study (specialization)
Machine Technology
Level of study
First-cycle studies
Form of study
full-time

Year/Semester
3/6
Profile of study
general academic
Course offered in
Polish
Requirements
compulsory

Number of hours

Lecture
15
Laboratory classes
15
Other (e.g. online)

Tutorials
Projects/seminars

Number of credit points

3

Lecturers

Responsible for the course/lecturer:
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Responsible for the course/lecturer:

Prerequisites

Students have a fundamental knowledge in the field of information technology, knowledge of manufacturing technology and process planning. Students are able to develop a model of the product using 3D CAD and to design the manufacturing process of the product. Students understand of the need to learn and acquire new knowledge.

Course objective

To familiarize students with the possibilities of using CAD/CAM systems to design machining processes and computer aided programming of CNC machines.

Course-related learning outcomes

Knowledge

Students are able to describe typical procedures and the course of proceedings when planning machining in CAD/CAM systems. Students know the typical cycles used in CAM systems for a given machining method. Students indicate the principles of selection of machining strategies in CAM systems depending on the technical requirements, accuracy and surface quality after machining, and workpiece geometry.

Skills

Students are able to prepare data for machining planning in CAD/CAM system. Students set-up the CAM module for planning machining of a specific geometry. Students select the right machining strategies depending on the workpiece geometry and technological requirements for given machining method. Students define trajectories for auxiliary tool movements at the beginig and at the end of the machining cycle. Students plan tool paths in the CATIA v5 CAM module. Students create a control program using available postprocessors. Students prepare documentation of the machining process in the CATIA v5 system.

Social competences

Students are capable of implementing information technology in engineering activities. They are able to independently develop knowledge of the subject. They can work in a design team using computer systems to support engineering work.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lectures

Forming rating:
Based on answers to questions concerning the material discussed in previous lectures.

Summary rating:
Knowledge acquired during lectures is verified by written test. The test consists of 5 open questions and one problem-related issue. A pass requires 50% correct answers.

Laboratories

Forming rating:
On the basis of an assessment of the current progress of tasks.

Summary rating:
The student's preparation for laboratory classes and the assessment of skills acquired during laboratory

exercises will be verified on the basis of individually performed tasks at the computer workstation, oral answers and written tests on the ability to use studied tools available in CAD/CAM systems.

Programme content

lectures:

1. Types and features of CAD/CAM systems. Methodology of planning the manufacturing process with CAD/CAM systems. Presentation of CATIA v5, Inventor CAM, EdgeCAM systems.
2. Creating NC control programs in CAM systems using geometric CAD models. Data exchange interfaces in CAD/CAM systems.
3. Methodology for turning planing with CAD/CAM systems. Planning aid for multi-axis and multi-tool turning.
4. Methodology for planing prismatic and surface milling. Multi-axis machining of complex surfaces with aid of integrated CAD/CAM systems.
5. Simulation and verification of the machining process in CAD/CAM systems. Collision analysis. Visualisation of manufacturing process.
6. Development priority of integrated CAD/CAM systems.

Laboratory classes:

1. Using the CAM module in the CATIA v5 integrated engineering system.
2. Definition of workpiece and raw material geometrical data and basic parameters for the Machining module of the CATIA v5 system. Selection of tools for machining cycles and tool entry and exit paths.
3. Design and verification of turning processes in Machining module of CATIA v5 system.
4. Design and verification of milling processes in CATIA v5 system.
5. Creating a control program using available postprocessors and preparing workshop documentation.

Teaching methods

Lecture: multimedia presentation illustrated with examples of machining planing in selected CAD / CAM systems.

Laboratory exercises: practical exercises, solving tasks at a computer workstation, designing the machining operations of given objects with the CATIA v5 system.

Bibliography

Basic

1. J. Pobożniak, Programowanie obrabiarek sterowanych numerycznie w systemie CAD/CAM CATIA V5, Helion 2014
2. W. Grzesik, P. Niesłony, M. Bartoszczuk, Programowanie obrabiarek NC/CNC, WNT Warszawa 2006
3. Dokumentacja systemu CATIA v5

Additional

1. M. Mielnica, W. Wiśniewski, Komputerowe wspomaganie projektowania procesów technologicznych, PWN, Warszawa 2005
2. K. Augustyn, EdgeCAM, Komputerowe wspomaganie wytwarzania, Helion 2006

Breakdown of average student's workload

	Hours	ECTS
Total workload	65	3,0
Classes requiring direct contact with the teacher	34	1,5
Student's own work (literature studies, preparation for laboratory classes, preparation for tests) [1]	31	1,5

[1] delete or add other activities as appropriate