Course description

1 General information

Course name	Computer Aided Manufacturing
Course code	M6-CAM
Level of study (B.Sc, M.Sc., Ph.D.)	B.Sc.
ECTS	4
Course manager	Dr inż. Janusz Pobożniak
Course length	One (1) semester
Coordinator for international programs	erasmus@mech.pk.edu.pl

2 Prerequisites

- Fundamentals of technical drawing

2 Program

Type		Classes	Labs	Computer labs	Project	Seminar
Hours	0	0	0	30	15	0

3 Contents

Computer labs		
No.		Hours
1	Manufacturing documentation including process plans, instruction sheets, set-up documentations. Management of manufacturing documentation	3
2	The basic knowledge about the numerical control as the foundation of Computer Aided Manufacturing: the structure of CNC control system, closed loop feedback control system, machine tool axis systems	3
3	The types of workpieces fixtures and tooling systems used in CAM technologies. CAM packages for metal cutting, additive technologies, laser cutting and grinding	3
4	The types of geometry models used in CAM systems: B-Rep geometry representation, rules for the development of models of parts, stock, fixtures and machine tools	3
5	Computer aided manufacturing solutions for 2.5D milling (including facing, pocketing, groove machining, line following, hole operations) and 5-axis surface machining (rough machining, z-level milling, multi-axis sweeping)	6
6	Computer aided manufacturing solutions for 2-axis turning and multi-head and multi-spindle machining	5
7	Simulation of manufacturing processes	3
8	Automation in Computer Aided Manufacturing based on group technology (GT) principles	2
9	Automation in Computer Aided Manufacturing based on rule technology, definitions of queries for machining operation selection, tool selection and the determination of process parameters	2

Project		
No.		Hours
1	Development of manufacturing process for rotational parts including the preparation of manufacturing documentation, selection of process structure and parameters, CNC machine tool programming and verification in laboratory on physical machine tool	3
2	Development of manufacturing process for prismatic part including the preparation of manufacturing documentation, selection of process structure and parameters, CNC machine tool programming and verification in laboratory on physical machine tool	3

13 Learning Outcomes (skills and knowledge):

- Knowledge on operation of Computer Aided Manufacturing including type of CAM systems and basics of operation of CNC systems
- Ability to develop the machining process for typical parts used in machining industry using the milling and turning technology
- Verification of manufacturing processes in virtual environment
- Student possess the ability to create noncomplex individual project.

4 Assessment policy (examination):

- Mean average of grades received for execution of several practical tasks

5   Literature

1   Zhuming Bi, Xiaoqin WangJ. Computer Aided Design and Manufacturing, 2020 John Wiley & Sons Ltd
2   Pobożniak Janusz, Programowanie Obrabiarek sterowanych numerycznie w systemie Catia, Helion 2015 (in Polish)
3   Ronald Sterkenburg, Garam Kim & Peng Wang, CATIA V5-6 2020 Computer Aided Manufacturing (CAM) Tutorials, eAcademic Books,20201
4   José V. Abellán-Nebot, Carlos Vila Pastor, Héctor Rafael Siller-Carrillo , Manufacturing Process Planning: A Practical Approach for Mechanical Engineering, Willey 2025