Study program: Industrial Engineering

Course title: CAM systems

Professor/assistant: PhD. Miloš S. Ristić

Type of course: compulsory

ECTS credits:5

Pre-requisites: -

Aims of the course:

Preparing the student to:

- apply knowledge of product modeling using CAD software;
- learn key principles of CAD / CAM technology;
- recognize, evaluate and suggest the appropriate computer-aided method of manufacturing;
- understand the concept of design technology and production systems using a computer and the structure of a CAM system;
- use the basics of CNC technology and CNC programming (G and M code);
- apply the principles of data exchange (STEP and IGES).

Learning outcomes:

Uponsuccessfulcompletionofthecourse,astudent is able to:

- identify basic concepts and benefits of CAx technology;
- assess the constructive characteristics of CNC processing systems;
- explain the importance of modern CAD / CAM technologies;
- design and construct a CAD model of the product and integrate it with the CAM tool;
- prepare and manufacture the product using an integrated CAD / CAM system;
- program the CNC system using G-code and M-code.

Syllabus

Theoretical part

Simultaneous (concurrent) engineering. Product life cycle management. CAD technology. CAD / CAM technology. Design of technological and production processes using computers. The basic structure of the CAM system. Technological and production features. Numerically controlled machine tools. Basic concepts and goals of the CNC. Principles, methods and classification of CNCs. Structure of CNC system, components of CNC system. Introduction to CNC programming. Coordinate and measuring machine tools systems. G-code and M-code. Constructive characteristics of CNC processing systems. CNC processing systems. Generation of CNC programs and technical documentation. CNC rapid prototyping systems. CNC systems based on additive technologies. Exchange of information about products and processes.

Practical part

Introduction to CNC processing systems of various designs and application areas. Choice of CNC systems for specific production conditions, types of processing and processing objects. Product design using CAD tools. CAD model integration with CAM system. Creating a virtual product. Manufacturing products on a 3D printer.

Literature

1. Manić M., Spasić D., *Numeričkiupravljanemašine*, VTŠ Niš and MF Niš, 1999.
2. Devedžić G., *CAD / CAM tehnologije*, Mašinskifakultet u Kragujevcu, Kragujevac, 2006.
3. Overby A., *CNC Machining Handbook*, McGraw-Hill, New York, 2011.
4. Ćirković R., *Programiranje CNC mašina: FeatureCAM*, Mikroknjiga, Beograd, 2015.

Number of active classes			Other forms of teaching:
Lectures: 2	Practical classes: 1	Research work:1	

Teaching methods Lectures, practice and laboratory exercises are carried out in the classroom with presentations, simulations and video files. Consultations, seminar papers and company visits are an integral form of teaching of this course.

Grading system (maximum 100 points), **grading scale**from 5 to 10: below 51 points grade 5, grade 6 from 51-60 points, grade7 from 61-70 points, grade8 from 71-80 points, grade 9 from 81-90 points, grade 10 from 91-100 points.

Pre-exam obligations	**points**	**Final exam**	**points**
activity during theoretical lectures	**10**	written exam	**30**
practical training		oral exam	
colloquium(s)/seminar papers	**20+20+20**		
Sum	**70**	**Sum**	**30**