CAM Systems (6051-M)　　　　5 ECTS

Lecturer:　　**F. Pušavec, P. Krajnik**

Lectures: 30h　│　Tutorials: 0h　│　Labs: 30　│　Project: 0h　│　　　　　│ Lang. :

Objectives

The objectives of this course are to provide in-depth knowledge of CAM technologies as an upgrade of machining processes. Students will become familiar with advanced CAM principles and their application to various cutting technologies, including turning, milling, 5-axis machining, and robotic machining. The course covers also machine tools, their construction, characterisation techniques, key components, tool load estimation, and basic machine tool control.

Programme

1. Introduction to CAD/CAM and CAM systems
2. Machine tool loads and cutting forces
3. CAD–CAM workflow and post-processors
4. Manufacturing systems and machine tool kinematics
5. Machine tool structure and dynamics
6. Key elements of machine tools
7. Control of machining processes
8. Planning of cutting paths and machining strategies
9. CAM for turning, milling, 5-axis machining, and robotic machining
10. Diagnostics and smart systems

Prerequisites

In order to successfully achieve this course, the students must have:
- BSc in Mechanical Engineering
- Basics on production engineering
- Good knowledge of machining processes

Learning outcomes

After attending this course, the student will:
- In-depth theoretical, methodological and analytical knowledge on the principles of computer-aided machining pathways / strategies, which is the basis for research and application work.
- Be aware of advanced CAM principles to complex machining processes
- Be able to design machining strategies and cutting paths
- Use CAM tools for virtual simulation and process optimization
- Understand machine tool components, kinematics and control fundamentals
- Be aware of diagnostic equipment and smart systems

Assessment

Assessment will be composed of three segments:
- Theoretical exam: 50%
- Lab. works: 30%
- Individual work/seminar: 20%

Literature

1. Z. Bi in X. Wang, Computer aided design and manufacturing. Hoboken, NJ; [New York, New York]: John Wiley & Sons, Inc.; ASME Press, 2020, str. XXI, 18 f., 617. ISBN 978-1-119-53421-1, [COBISS.SI-ID 44464899].
2. Handbook of manufacturing industries in the world economy. Cheltenham: Edward Elgar Publishing, 2015, str. XVII, 519. ISBN 978-1-78100-392-3, [COBISS.SI-ID 15869979].
3. J. Novak Marcinčin, I. Kuric, T. Mikac, in B. Barišić, Computer support for improvement of engineering and manufacturing activities. Košice: Faculty of Manufacturing Technologies, 2009, str. 241. ISBN 978-953-6326-63-1, [COBISS.SI-ID 14028059].
4. F. Pušavec and P. Krajnik:, Teaching materials for CAM course (slides and additional materials used in lectures and practical classes), are given to students prior start of the lecture sequence.