

Caxx Techniques

Code: MK3CAXXR06R117-EN

ECTS Credit Points: 6

Evaluation: mid-semester grade

Year, Semester: 3rd year, 2nd semester

Its prerequisite(s): Modelling and Simulation Prototype Technologies I

Further courses are built on it: Yes/No

Number of teaching hours/week (lecture + practice): 2+4

Topics:

CAXX technology theory summary: CAD, CAPP, CAM. Computer aided principles and technologies of machine production. Productivity and troubleshooting measurement with computer aided tools. Teamwork and cooperation with CAXX technologies.

CAXX technologies for Mechanical engineering practice: geometry design: creation of simple and complex surfaces and volumes. Modell extension with material, load and manufacturing properties. Connection of CAXX and CNC technologies. Practical examples: design and modelling of mechanism and drives.

CAXX technologies for Electrical engineering practice. Cabling and control cabinet design: cable size, cross section, labelling, colour code. Considering assembly best practices during design. Printed circuit design with CAXX technologies: selection of active and passive components' packages, wiring design along geometrical and electrical design rules.

Final element method (FEM) design in mechanical and electrical engineering practices.

Manufacturing with Rapid prototyping: material removal (cutting) and additive technologies. Rapid prototype manufacturing for mechanical and electrical engineering products.

Literature:

Compulsory:

- Chee Kai Chua, Kah Fai Leong, Chu Sing Lim "Rapid Prototyping: principles and Applications", 2010, World Scientific
- A. K. Theraja, "Textbook of Electrical Technology", 2016, S Chand & Company Limited
- R. S. Khandpu, "Printed Circuit Boards: Design, Fabrication, Assembly and Testing", McGraw-Hill Publishing Ltd, 2005

Schedule

1st week Registration week

2nd week:

Lecture: Introduction to CAXX technologies theory

Practice: CAXX technology practice

4th week:

Lecture: CAXX technology: cooperation and teamwork.

Practice: Practice on CAXX technology: productivity and teamwork.

6th week:

Lecture: CAXX technologies for Mechanical engineering practices:

3rd week:

Lecture: CAXX technology: effectiveness and productivity

Practice: Practice on CAXX technology: effectiveness and productivity

5th week:

Lecture: CAXX technologies for Mechanical engineering practices: geometrical model.

Practice: CAXX technologies for Mechanical engineering practices: geometrical model design

7th week:

Lecture: CAXX technologies for Electrical engineering practice: cable

material and load properties.

Practice: CAXX technologies for Mechanical engineering practices: material and load properties practice.

8th week: 1st drawing week

9th week:

Lecture: CAXX technologies for Electrical engineering practice: control cabinet design.

Practice: CAXX technologies for Electrical engineering practice: control cabinet design practice.

11th week:

Lecture: CAXX technologies for Electrical engineering practice: printed circuit design.

Practice: CAXX technologies for Electrical engineering practice: printed circuit design practice.

13th week:

Lecture: Rapid prototyping: manufacturing with cutting technology.

Practice: Rapid prototyping: cutting manufacturing practice.

15th week: 2nd drawing week

design.

Practice: CAXX technologies for Electrical engineering practice: cable design practice.

10th week:

Lecture: CAXX technologies for Electrical engineering practice: component packages and modules.

Practice: CAXX technologies for Electrical engineering practice: packages and modules design practice.

12th week:

Lecture: Rapid prototyping: manufacturing technology theory.

Practice: Rapid prototyping: practice.

14th week:

Lecture: Rapid prototyping: manufacturing with additive technology.

Practice: Rapid prototyping: additive manufacturing practice.

Requirements

A, for a signature:

Attendance at **lectures** is recommended, but not compulsory.

Participation at **practice** is compulsory. Students must attend the practice classes and may not miss more than three times during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Students can't make up a practice class with another group. Attendance at practice classes will be recorded by the practice leader. Being late is counted as an absence. In case of further absences, a medical certificate needs to be presented. Missed practices should be made up for at a later date, being discussed with the tutor. Students are required to bring the drawing tasks and drawing instruments to the course with them to each practice class. Active participation is evaluated by the teacher in every class. If a student's behavior or conduct doesn't meet the requirements of active participation, the teacher may evaluate his/her participation as an absence because of the lack of active participation in class.

During the semester there are two tests, students have to sit for the tests.

B, for grade:

The course ends in a **mid-semester grade** based on the test results.

The minimum requirement for both mid-term and end-term tests is 50%. Based on the score of the tests separately, the grade for the tests is given according to the following table:

Score	Grade
0-39	fail (1)

40-52	pass (2)
52-63	satisfactory (3)
64-71	good (4)
72-80	excellent (5)

If the score of the sum of the two tests is below 40, the student once can take a retake test of the whole semester material.