

Vehicle Manufacturing II

Code: MK3JGY1J04JJ20-EN

ECTS Credit Points: 4

Evaluation: mid-semester grade

Semester: 6th semester

Its prerequisite(s): Vehicle Manufacturing I

Further courses are built on it: Yes/No

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

Topics:

Analysis of dimension chains in aspect of manufacturability. Construction, technological and measuring locating elements. Calculation of total and operation allowances. Analysis of cutting technologies (turning, drilling, milling, grinding, planning and slotting technologies). Determination of the technological parameters for the production of vehicle elements. Geometric establishment of cutting tools. Special manufacturing methods. Manufacturing of toothed elements. Electric discharge machining, ultrasonic manufacturing, electrochemical milling, thermal material separation. Laser, plasma and waterjet cutting technologies. Manufacturing designing of typical vehicle elements. Device designing on the vehicle production: typical device constructions, collision, orientation, clamping methods of workpieces and tools. Designing of assembly systems. Quality assurance of the assembly processes. CAD and CAM systems on the total manufacturing processes. Types and structures of manufacturing systems.

Literature:

Compulsory:

- Klocke, F.: Manufacturing Processes I., Cutting, Springer, RWTH edition, 2011, ISBN 978-3-642-11978-1, p. 524.
- Halderman, J. D.: Automotive Technology, Fourth edition, Pearson New International Edition, 2014, ISBN 10: 1-292-04218-4, p. 1831
- Gupta, H. N., Gupta, R. C., Mittal, A.: Manufacturing Processes, Second Edition, New Edge International Publishers, 2009, ISBN (13): 978-81-224-2844-5, p. 194.
- Kief, H. B., Roschiwal H. A.: CNC Handbook, The McGraw-Hill Companies, 2011, ISBN 978-0-07-179948-5, p. 451
- Liker, J.: The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer, 2004. McGraw-Hill Education, ISBN: 978-0071392310

Schedule

1st week Registration week

2nd week:

Lecture: Analysis of dimension chains in aspect of manufacturability. Construction, technological and measuring locating elements. Calculation of total and operation allowances.

3rd week:

Lecture: Analysis of turning technologies.

Practice: Task solutions for designing of turning technologies of vehicle elements

Practice: Task solutions for dimension chains and allowances for different technologies

4th week:

Lecture: Analysis of drilling technologies.

Practice: Task solutions for designing of drilling technologies of vehicle elements.

6th week:

Lecture: Analysis of different grinding technologies

Practice: Task solutions for designing of different grinding technologies of vehicle elements.

8th week: 1st drawing week

9th week:

Lecture: Electric discharge machining, ultrasonic manufacturing, electrochemical milling, thermal material separation.

Practice: Manufacturing designing of typical vehicle elements.

11th week:

Lecture: CAD and CAM systems on the total manufacturing processes.

Practice: Technological designing by EdgeCAM software

13th week:

Lecture: LEAN methods of vehicle systems. I.

Practice: Laboratory visiting. Manufacturing of special vehicle elements.

15th week: End-term test

5th week:

Lecture: Analysis of different milling technologies.

Practice: Task solutions for designing of different milling technologies of vehicle elements.

7th week:

Lecture: Analysis of planning and slotting technologies. Geometric establishment of cutting tools.

Practice: Task solutions for designing of planning and slotting technologies of vehicle elements. Special manufacturing methods. Manufacturing of toothed elements

1st Mid-term test

10th week:

Lecture: Device designing on the vehicle production: typical device constructions, collision, orientation, clamping methods of workpieces and tools.

Practice: Designing of assembly systems. Quality assurance of the assembly processes.

12th week:

Lecture: Types and structures of manufacturing systems.

Practice: Vehicle assembly designing by SolidWorks software.

14th week:

Lecture: Basics of automotive quality principles

Practice: Quality complaints, basics of process development in manufacturing, case studies

A, for a signature:

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

Participation at **practice classes** is compulsory. Students must attend the practice classes and may not miss more than three of the during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Students cannot make up practice classes with another group. Attendance at practices will be recorded by the practice leader. Being late is equivalent with 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 for 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 their participation as an absence because of the lack of active participation in class.

Students have to **take part in laboratory measures** and submit the measuring reports minimum on a sufficient level.

During the semester there are two tests: the mid-term test in the 8th week and the end-term test in the 15th week. Students have to sit for the tests.

B, for a grade:

The course ends with an **examination**. Based on the average of the grades of the measuring reports and the examination, the exam grade is calculated as an average of them:

- the average grade of the measuring reports
- the result of the examination

The minimum requirement for the mid-term and end-term tests and the examination respectively is 60%. Based on the score of the tests separately, the grade for the tests and the examination is given according to the following table:

Score	Grade
0-59	fail (1)
60-69	pass (2)
70-79	satisfactory (3)
80-89	good (4)
90-100	excellent (5)

If the score of any test is below 60, students can take a retake test in conformity with the EDUCATION AND EXAMINATION RULES AND REGULATIONS.