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| **Manufacturing Planning** |

**Code: MFGYA31G34-EN**

**ECTS Credit Points: 4**

**Evaluation: mid-semester grade**

Year, Semester: 3rd year/1st semester

Number of teaching hours/week:

Lecture: **2**

Practice: **2**

**Prerequisites: Manufacturing Processes III. MFGYT33G03-EN**

**Topics**:

This course is a study of the efficient and effective utilization of manufacturing resources. Course topics include: optimization of technological data. Material requirements planning. Capacity requirements planning. The design of (Go - No Go) gauges; the function of gauges in production; the main types of gauges and their principle of operation. Production planning supported by computers. CNC programming. CNC control. Parts of the CNC documentation. Types and construction of NC and CNC machine tools. Programming exercises. Integrated material data processing systems. Integrated manufacturing systems.

**Literature:**

Required:

1. Manufacturing, B. Benhabib, Marcel Dekker Inc. 2003. ISBN 0-8247-4273-7
2. Manufacturing Engineering and Technology, S. Kalpakjian, S. R. Schmid, Fourth Edition, Prentice Hall Publ. 2001. ISBN 0-201-36131-0

Recommended:

1. Manufacturing Automation, Y. Altintas, Cambridge University Press 2000., ISBN 0-521-65973-6
2. Fundamentals of Modern Manufacturing, Mikell P. Groover, John Wiley & Sons. 2006. ISBN 0471744859

**Schedule**

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| **1st week:**  **Lecture:** Overview of different manufacturing principles. Selection of the best fitted manufacturing model.  **Practice:** Giving personal tasks to make during the semester. Introducing basic calculation models for capacity planning. | **2nd week:**  **Lecture:** Custom manufacturing model (Basic rules, capacity calculation, storage solutions, optimization of the production, applicability in real industry)  **Practice:** Case studies. |
| **3rd week:**  **Lecture:** An intermittent and batch manufacturing model (Basic rules, capacity calculation, storage solutions, optimization of the production, applicability in real industry)  **Practice:** Case studies. | **4th week:**  Lecture :A continuous manufacturing model (Basic rules, capacity calculation, storage solutions, optimization of the production, applicability in real industry)  **Practice:** Case studies. |
| **5th week:**  **Lecture:** A flexible manufacturing model (Basic rules, capacity calculation, storage solutions, optimization of the production, applicability in real industry).  **Practice:** Case studies. | **6th week:**  **Lecture:** Capacity planning (Overview of different possibilities, calculation methods, applied methods in different industries)  **Practice:** Calculation on a special case (for nuclear devices). |
| **7th week:**  **Lecture:** Quality management at a company (Measuring equipments, gauges & it’s importance and design methods)  **Practice:** Case studies, practical measuring. | **8th week:**  **Mid-term test**  **Lecture:** CIM (How it works, - to design, -operate, -manage a system, maintenance)  **Practice:** Case studies. |
| **9th week:**  **Lecture:** CNC (programming, control, documentation)  **Practice:** Case studies. | **10th week:**  **Lecture:** CNC2(types, design, production of a CNC machine)  **Practice:** Case studies. |
| **11th week:**  **Lecture:** CNC programs.  **Practice:** CNC programming and simulation. | **12th week:**  **Lecture:** CNC production modeling.  **Practice:** Simulation. |
| **13th week:**  **Lecture:** Integrated material data processing systems.  **Practice:** Case studies | **14th week:**  **Lecture:** Integrated manufacturing systems. Summary of the semester.  **Practice:** Case studies |
| **15th week:**  **End-term test** |  |

**Requirements**

**A, for a signature:**

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

Participation at **practice** classes is compulsory. A student 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 equivalent with an absence. In case of further absences, a medical certificate needs to be presented. Missed practice classes should be made up for at a later date, being discussed with the tutor. 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.

Students have to **submit all the tasks** as scheduled 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 in a **mid-semester grade (AW5)**. Based on the average of the grades of the drawings and the average of the test results, the mid-semester grade is calculated as an average of them:

* the grade of the drawing task
* the average grade of the two tests

The minimum requirement for the mid-term and end-term tests is 60%. Based on the score of the tests separately, the grade for the tests 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 once can take a retake test of the whole semester material.