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| **Manufacturing Processes I.** |

**Code: MFGYT31G04-EN**

**ECTS Credit Points: 4**

**Evaluation: exam**

Year, Semester: 1st year/2nd semester

Number of teaching hours/week:

Lecture: **2**

Practice:**1**

**Prerequisites: Materials Science I. MFANI31G04-EN**

**Topics**:

Basic principles of mechanical engineering. Overview of generally used raw materials manufacturing processes (steel-, copper-, alumina based and other alloys). Introduction of the basic material removal manufacturing processes. The basic concept of cutting, applicable tools and tool materials. Machining processes, turning, milling, drilling, planning, chipping, abrasive processes, gearing, and thread cutting technology. Methods of tool life analysis and management. Special machining, UP, HSC, electrochemical, laser-, and water-jet cutting.

**Literature:**

1. L. Edwards, M. Endean: Manufacturing with Materials, Butterworths, London, 1990., ISBN 0-408-02770-3
2. M. F. Ashby: Materials Selection in Mechanical Design. 3.rd edition. Elsevier. London, 2005. ISBN 0-7506-6168-2.
3. [DeGarmo's Materials and Processes in Manufacturing, 10th Edition](http://eu.he.wiley.com/WileyCDA/HigherEdTitle/productCd-047005512X.html) DeGarmo, Black, Kohser, 2008.ISBN: 978-0-470-05512-0
4. [Fundamentals of Modern Manufacturing: Materials, Processes, and Systems, 3rd Edition](http://eu.he.wiley.com/WileyCDA/HigherEdTitle/productCd-0471744859.html), Groover, 2007. ISBN: 978-0-471-74485-6

**Schedule**

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| **1st week:**  **Lecture:** Basic principles of manufacturing technologies.  **Practice:** The practice classes are separated into 4 different practice types means 4x3 lectures in the semester instead of 1 lecture per week. | **2nd week:**  **Lecture:** Types of manufacturing methods, a chip generation process, chip types  **Practice:** Machining Practice (on a turning machine) |
| **3rd week:**  **Lecture:** Cutting force and cutting tool geometries and the affects of the accuracy of workpieces. Factors of the cutting force.  **Practice:** Action planning practice (shaft-typed workpieces) | **4th week:**  **Lecture: S**haft tool wear, tool life and its equations. The economics of the machining an economical method for calculating tool life  **Practice:** Tool-geometry practice (dimensional analysis of different cutting tools) |
| **5th week:**  **Lecture: P**arts of cutting tools and their classification, tool materials.  **Practice:** Dimensional measuring practice | **6th week:**  **Lecture:** Single-point cutting tools, turning tools, planer knives, chisel knives  **Practice:** Presenting the results of the task |
| **7th week:**  **Lecture:** Boring tools, drill bits, countersinks, reamers, saws, structural design, the applicability of them. Types of grooving tools, the main steps of the applicability of tool designing.  **Practice:** Presenting the results of the task. | **8th week:**  **Mid-term test**  **Lecture:** Design of milling tools, types, usability.  **Practice:** Presenting the results of the task. |
| **9th week:**  **Lecture:** Threading tools, gear manufacturing tools, grinding tools. Fine machining.  **Practice:** Presenting the results of the task | **10th week:**  **Lecture:** Classification of turning machines. Design and components analysis.  **Practice:** Presenting the results of the task |
| **11th week:**  **Lecture:** Classification of milling machines. Design and components analysis.  **Practice:** Presenting the results of the task. | **12th week:**  **Lecture:** Classification of grinding and gear production machines. Design and component analysis.  **Practice:** Presenting the results of the task |
| **13th week:**  **Lecture:** Special technologies. Electric arc cutting, ultrasonic milling, water-jet cutting, electro-polishing.  **Practice:** Presenting the results of the task | **14th week:**  **Lecture:** Methods to design a production technology. Calculation of basic technological parameters.  **Practice:** Presenting the results of the task |
| **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 practices 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. A student can’t make up any 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, to be 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 with an **exam**.

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.