**Material Handling**

**Code: MFARO31G03-EN**

**ECTS Credit Points: 3**

**Evaluation: AW5**

Year, Semester: 3rd year/1st semester

Number of teaching hours/week:

Lecture: **2**

Practice: **1**

**Prerequisites: MFGEP32G05-EN** Logistics I.

**Topics**:

Basic concepts of handling and conveyance of materials. Classification of material handling systems. Fundamental elements of material handling systems. Properties of handled materials. Configurations and calculations of continuous operating material handling equipment: belt conveyors, bucket elevators, overhead conveyors, roller conveyors, screw conveyors, pneumatic conveyors. Powered industrial trucks and forklifts. Design and safety rules of cranes and lifting equipment. Introduction to unit load forming and container transporting technologies. Introduction to warehousing principles and technologies. Automatic storage warehouses with high racks and their equipment. Stacker cranes.

Literature:

Mulcahy, David E.: *Materials Handling Handbook*; McGraw-Hill Professional, 1999; ISBN 007044014X

**Schedule**

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| **1st week:**  **Lecture:** Basic concepts for handling and conveyance of materials. Classification of material handling systems.  **Practice:** Basic calculations of material handling.  **2nd week:**  **Lecture:** Fundamental elements of material handling systems. Properties of handled materials.  **Practice:** Basic calculations of handled materials.  **3rd week:**  **Lecture:** Continuous operating materials handling equipment: belt conveyors. Configurations of belt conveyors.  **Practice:** Basic calculations of belt conveyors.  **4th week:**  **Lecture:** Designing principles and safety equipment of belt conveyors.  **Practice:** Designing calculations of belt conveyors.  **5th week:**  **Lecture:** Continuous operating material handling equipment: bucket elevators. Configurations of bucket elevators.  **Practice:** Designing calculations of bucket elevators.  **6th week:**  **Lecture:** Continuous operating material handling equipment: overhead conveyors. Configurations of overhead conveyors.  **Practice:** Designing calculations of overhead conveyors.  **7th week:**  **Lecture:** Continuous operating material handling equipment: roller conveyors and screw conveyors. Configurations of roller and screw conveyors.  **Practice:** Designing calculations of roller and screw conveyors. | **8th week:**  **Mid-term test**  **Lecture:** Continuous operating material handling equipment: pneumatic conveyors. Configurations of pneumatic conveyors.  **Practice:** Designing calculations of pneumatic conveyors.  **9th week:**  **Lecture:** Powered industrial trucks and forklifts. Configurations and safety equipment of trucks.  **Practice:** Calculations about stability of forklifts. A forklift truck loading diagram.  **10th week:**  **Lecture: ISO** Cranes and lifting equipment. Configurations of cranes.  **Practice:** Basic calculations of cranes.  **11th week:**  **Lecture:** Designing and safety rules of cranes. Safety equipment of hoisting machines.  **Practice:** Designing calculations of cranes, part 1.  **12th week:**  **Lecture:** Introduction to unit load forming and container transporting technologies.  **Practice:** Designing calculations of cranes, part 2.  **13th week:**  **Lecture:** Introduction to warehousing principles and technologies.  **Practice:** Basic calculations about warehousing.  **14th week:**  **Lecture:** Automatic storage warehouses with high racks and their equipment. Stacker cranes.  **Practice:** Designing calculations of stacker cranes.  **15th week:**  **End-term test** |

**Requirements**

**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 practice classes during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Student can’t make up a practice class with another group. Attendance at practice 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.

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 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, the student once can take a retake test covering the whole semester material.