Maintenance Engineering I

Code: MK3UZK1G05G117-EN

ECTS Credit Points: 5

Evaluation: mid-semester grade

Year, Semester: 3rd year, 1st semester

Its prerequisite(s): MK3GYT2G05GX17

Further courses are built on it: Yes

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

Topics:

Maintenance Policies, Impact, Benefits and Effects of Maintenance, Principles of Maintenance, Organization and Management of the Maintenance Function, The importance of an overall maintenance strategy, Operating Policies of Effective Maintenance, Maintenance management methods, Maintenance Engineering Roles and Responsibilities, Performance Measurement and Management, Development of Maintenance Engineering Practices, Maintenance Equipment and Facilities, Maintainability and Its Costs, Maintainability Analysis, Economic Aspects of Maintenance, Life Cycle Costs, Maintenance Costs, Maintenance Budget, Cost Control, Maintenance Audit.

Literature:

Compulsory:

- Reinert Kenneth, A: An introduction to International Economics: New Perspectives on the World Economy 2nd. Cambridge University Press, 2011. ISBN: 1107003571, 97811070
- R. K. Mobley: Maintenance Fundamentals Butterworth-Heineman, 2004. ISBN: 9780750677981
- R. K. Mobley, L. R. Higgins, D. J. Wikoff: Maintenance Engineering Handbook McGraw-Hill, 2008

Recommended:

- J. Moubray: Reliability-Centered Maintenance Industrial Press Inc., 2001. ISBN-13: 978-0831131463 ISBN-10: 0831131462
- R. Smith, R. K. Mobley: Rules of Thumb for Maintenance and Reliability Engineers Elsevier, 2007. ISBN: 9780750678629

Schedule

1st week Registration week	
2nd week: **Lecture:** Maintenance Policies, Impact, Benefits and Effects of Maintenance, Principles of Maintenance **Practice:** KIPA method in practice	**3rd week:** **Lecture:** Organization and Management of a Maintenance Function, The importance of an overall maintenance strategy, Operating Policies of Effective Maintenance **Practice:** Case studies
4th week: **Lecture:** Maintenance management methods, Maintenance Engineering Roles and Responsibilities, Performance Measurement and Management, Development of Maintenance Engineering Practices	**5th week:** **Lecture:** Maintenance Equipment and Facilities, Maintainability and its costs, Maintainability Analysis.

Practice: Human Resources of Maintenance Organization	**Practice:** Maintenance Facilities and Rooms in industrial environment
6th week:	7th week:
Lecture: Economic Aspects of Maintenance, Life Cycle Costing, Maintenance Costs, Maintenance Budget, Cost Control, Maintenance Audit **Practice:** Life cycle calculation and costs	**Lecture:** The control of maintenance costs while improving reliability. Avoid or mitigate of the impact of operational failures, Estimating Repair and Maintenance Costs, Key Performance Indicators **Practice:** KPI system in practice
8th week: 1st drawing week	
9th week:	10th week:
Lecture: Types of Maintenance Systems, Corrective Maintenance, Reliability-Based Preventive Maintenance, Predictive Maintenance	**Lecture:** Organizational Structure for Maintenance, Effective maintenance organizations, Maintenance Levels, Responsibilities of Maintenance Department
Practice: Visual Management	**Practice:** Case studies from industrial environment
11th week:	12th week:
Lecture: Maintenance Planning and Scheduling, Planning of Maintenance Function, Manpower Allocation, Long-range Planning, Development of Maintenance Department, Short-range Planning, Planning Techniques, Planning Procedure	**Lecture:** Estimation of Maintenance Work, Maintenance Control, Maintenance Scheduling, Work Order System, Work-order Procedure, Creating a Set of Priority Functions, Forecasting Maintenance Requirements, Planned Maintenance Procedure
Practice: Supply Chain Management	**Practice:** Ergonomy
13th week:	14th week:
Lecture: Maintenance Evaluation, Reliability in Maintenance, Economics of Reliability, Quality and Reliability, Reliability Improvement, Reliability Testing, Design for Reliability	**Lecture:** Root cause analysis (RCA) and Root cause failure analysis (RCFA), Failure-Mode and Effect Analysis (FMEA), Concept of safety, reliability and risk, Environmental impacts, Six Sigma Safety, Zero-Injury Safety Culture
Practice: Maintainability. Design for Maintainability, Terotechnology, Objectives of terotechnology, Principles of terotechnology	**Practice:** Costs of implementing terotechnology, Introducing terotechnology to an organization
15th week: 2nd drawing week	

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 a practice 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 practices 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 behaviour or conduct doesn't meet the requirements of active participation, the teacher may evaluate his/her participation as an absence due to the lack of active participation in class. 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 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.