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| **Title and Code** of the subject:  **Quality control and quality management MTMEL7012A** | **ECTS Credit Points: 4** |
| **Type** of the subject: compulsory / optional | |
| **Ratio of theory and practice: 66/33** (credit%) | |
| **Type and number of classes per semester**: 28 hour(s) lecture and 14 hour(s) practice per **semester,** Number of teaching hours / week : 2+1 (lecture and practice) | |
| **Type of exam**: exam / practical course mark | |
| **Subject in the curriculum:** 2nd semester | |
| Preliminary requirements: *-* | |

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| **Summary of content - theory**: |
| Course objectives:  The course covers the concept and importance of quality, the historical background, the concept of quality assurance. Development of quality management, evolvement of total quality management from the quality checking of the manufactures. Quality tools and techniques are also discussed and are the main topics of the practice. LEAN as main goal and practice with its tools in industry is also presented. Audit of the quality control systems and the accreditation techniques as well as quality assurance in laboratory are covered.   1. Legal aspects of quality management. Warranty, product liability, certification of product safety, compliance. Contracts. 2. The concept of quality, process elements of quality, external and internal factors of quality. Crosby’s quality absolutes. Juran’s quality planning pathway. 3. Edward Deming’s philosophy. Quality management plan (PDCA cycle) 4. Economic aspects of quality management. Cost of quality (Feigenbaum), Process-cost. Quality controlling. 5. The Japanese philosophy: kaizen. KAIZEN tools. 6. Total quality management. Kaizen in TQM in ISO 9000. 7. Process-orientation and process control 8. Standardization, system management standards. Elements of quality management. 9. Project-management. 10. LEAN. LEAN tools: six sigmas, DMAIC, value stream mapping 11. Good Laboratory Practice 12. Accreditation techniques. 13. Metrology. Measurement and control of measurement by the ISO 9000 standards. 14. Calibration and validation. Characteristics and formality of quality assurance of analytics. |
| **Summary of content - practice**: |
| 1. Root cause analysis -5 Why method, Flowcharting 2. Root cause analysis – Fishbone diagram 3. Root cause analysis – Affinity diagram 4. Check sheet 5. Histogram 6. Pareto diagram and ABC diagram 7. Gantt diagram 8. Scatter plot 9. Control charts 10. Force field analysis 11. Break-even analysis 12. Matrix of competence 13. FMEA 14. 5S method and self-test |
| **Literature, handbooks in English** |
| 1. Pojasek: Lean, Six Sigma, and the Systems Approach: Management Initiatives for Process Improvement Environmental Quality Management, 13 (2), 2003. 2. Soković et al. (2009): Basic Quality Tools in Continuous Improvement Process Journal of Mechanical Engineering 55, 5 3. Pusztahelyi, T. (2019) Practical exercises for the Course “Quality control, quality management” handout. EFOP-3.4.3-16-2016-00021 |
| **Competencies gained** *(acc. to the Regulation on training and outcome requirements)* |
| 1. **Knowledge:**  * on historical background of quality management and its tendencies * on project management and its techniques  1. **Skills:**  * Ability of decision making and problem solving * Ability in team-working  1. **Attitude:**  * Good sense of responsibility * Comitted to production in high quality  1. **Autonomy and responsibility:**  * In decision making * In decision making as project manager |

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| **Responsible lecturer: Tünde Pusztahelyi PhD, associate professor** |
| **Other lecturer(s): -** |

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| **Terms of course completion:** |
| Completing exercises |
| **Form of examination:** |
| written test on the basis of the lecture and the practical course |
| **Requirement(s) to get a signature:** |
| Attendance at the lectures is recommended, but not compulsory. Attendance at the practices is compulsory. Students may not miss more than three practices during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. In case of further absences, a medical certificate needs to be presented. |
| **Requirement(s) to get a grade:** |
| The course ends in a grade based on the test result. The minimum requirement for the test is 50%. The grade for the test is given according to the following table:  ScoreGrade  0-49% fail (1)  50-59% pass (2)  60-69% satisfactory (3)  70-79% good (4)  80-100% excellent (5) |

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| **Exam questions:** |
| 1. Legal aspects of quality management. 2. The concept of quality, process elements of quality, external and internal factors of quality. Crosby’s quality absolutes. Juran’s quality planning pathway. 3. Edward Deming’s philosophy. Quality management plan (PDCA cycle) 4. Cost of quality (Feigenbaum), Process-cost. 5. Kaizen and its tools. 6. Total quality management. 7. Process-orientation and process control 8. Standardization, system management standards. 9. Project-management. 10. LEAN and LEAN tools 11. Good Laboratory Practice 12. Accreditation techniques. 13. Control of measurement. 14. Calibration and validation. Quality assurance of analytical laboratories. |