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| **MENG482 – Engineering Metallurgy** | | | | | | | |
| **Eastern Mediterranean University**  **Faculty of Engineering** | | | | | | | |
| **Department:**MechanicalEngineering | | | | | | | |
| **ProgramCode:** 23 | | **Program:** Mechanical Engineering | **Year/Semester:**2022-2022 Spring | | | | |
| **Course Code:**  MENG482 | | **Course Title:**  Engineering Metallurgy | **Credit hours** | | | | |
| **Lec.** | | **Tut/Lab** | | **Total** |
| **4** | | **1** | | **4** |
| **Categorization of Course:**  Engineering or Area Core  Engineering Course offered by other programs  Engineering or Area Elective  Mathematics and Basic Sciences  General Education | | | **Categorization of Credits:**   1. Mathematics & Basic Science: - 2. **Engineering Topics: 4** 3. General Education: - | | | | |
| **Instructor Name:** Asst. Prof. Dr. Mohammed Asmael | | | | **Office no:**ME122 | | **Office Tel:**6301279 | |
| **Course Web Page:**<https://staff.emu.edu.tr/mohammedasmael/en> | | | | | | | |
| **Textbook(s):**   * G. E. Dieter. Mechanical Metallurgy. 2nd ed., Mc Graw-Hill * William D. Callister, Material Science and Engineering an Introduction, 7th ed., John Wiley & Sons, 2007   **Indicative Basic Reading List:** R.E. Smallman, A. H. W. Nagan, Physical Metallurgy and Advance Materials, 7th ed., Elsevier, 2007 | | | | | | | |
| **Catalog Description:** Mechanical and non-destructive tests; equilibrium diagrams and their interpretation; hardening of metals; deformation and annealing of metals; heat treatment of steels; corrosion and oxidation phenomena; alloy steels; non-ferrous metals and alloys; cast irons. | | | | | | | |
| **Prerequisite(s)** | MENG364 | | | | | | |
| **Type of Course** | Required  Selected Elective Elective | | | | | | |

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| **Student Outcomes** | |  |
| **1** | an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, andmathematics |  |
| **2** | an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety,and welfare, as well as global, cultural, social, environmental, and economic factors |  |
| **3** | an ability to communicate effectively with a range of audiences |  |
| **4** | an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, whichmust consider the impact of engineering solutions in global, economic, environmental, and societal contexts |  |
| **5** | an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusiveenvironment, establish goals, plan tasks, and meet objectives |  |
| **6** | an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment todraw conclusions |  |
| **7** | an ability to acquire and apply new knowledge as needed, using appropriate learning strategies. |  |

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| **Course Learning Outcomes** | | **Student Outcomes** | | | | | | | **Assessments and**  **Percentages** |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| **1** | Learning about Alloy steels and cast irons | Χ |  |  |  |  |  |  | Term project 20%  Midterm 30%  Final Examination 40 %  Weekly Quiz 10%  \* Project are group submissions, |
| **2** | Learning about corrosion and oxidation | Χ |  |  |  |  |  |  |
| **3** | Non ferrous metals | Χ |  |  |  |  |  |  |
| **4** | Non-Destructive Testing | X |  |  |  |  |  | X |
| **5** | Engineering methods for deformation ( fracture and fatigue) | Χ |  |  |  |  |  |  |
| **6** | Plastic deformation- Metallurgical aspects | X |  |  |  |  |  |  |
| **7** | Phase Transformations in steel alloys | X |  |  |  |  |  |  |
| **8** | Equilibrium diagrams and their interpretation | Χ |  |  |  |  |  |  |
| **9** | Heat treatment | X |  |  |  |  |  |  |
|  | **Weight of Student Outcomes** | **H** |  |  |  | **H** |  | **M** |  |

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| **Topics Covered and Class Schedule:** | |
| **Week 1** | Destructive tests |
| **Week 2** | Non-destructive test |
| **Week 3** | Non-destructive test |
| **Week 4** | Plastic deformation - Metallurgical aspects |
| **Week 5** | Plastic deformation - Mechanical aspects |
| **Week 6** | Equilibrium diagrams and their interpretation |
| **Week 7** | Phase Transformations |
| **Week 8** | **Midterm Examination** |
| **Week 9** | **Midterm Examination** |
| **Week 10** | Heat treatment of steels |
| **Week 11** | Hardening of metals |
| **Week 12** | Alloy steels & Cast iron |
| **Week 13** | Alloy steels & Cast iron |
| **Week 14** | Non-ferrous metals and alloys & Composites |
| **Week 15** | Corrosion of metal |
| **Week 16** | **Final Examination** |

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| **Project/ Laboratory Work** | | | | |
| **No.** | **Experiment Title and Equipment Used** | **CLO** | **SO** | **Percentage** |
| **1** | **Title:**  **Equipment:** |  |  | - |
| **2** | **Title:**  **Equipment:** |  |  | - |