|  |
| --- |
| **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 [x] 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 [x]  Selected Elective [ ] Elective |

|  |  |
| --- | --- |
| **Student Outcomes**  |  |
| **1** | an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, andmathematics | **[x]**  |
| **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. | **[x]**  |

|  |  |  |
| --- | --- | --- |
| **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** |  |

|  |
| --- |
| **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**  |

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