**ESOGU MECHANICAL ENGINEERING DEPARTMENT**

**COURSE INFORMATION FORM**

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| **Course Name** | **Course Code** |
| MECHANICS OF MATERIALS | 151813556 |

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| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| 3 | 4 | 0 | 6 |

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| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
| 1 | 1 | 1 | 0 | 0 |

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| **Course Language** | **Course Level** | **Course Type** |
| English | Undergraduate | Compulsory |

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| **Prerequisite(s) if any** | -- |
| **Objectives of the Course** | Solid bodies undergo deformations under mechanical loadings. These deformations and the internal resistance to deformations (stresses) are prominent parameters which play crucial roles in failure mechanisms of solid bodies. Such internal parameters must be well studied to be able to design engineering structures and parts, which is the main scope of this course. |
| **Short Course Content** | Concept of Stress, Concept of Strain and Deformation, Poisson’s Ratio and Bulk modulus, Torsion, Analysis and Design of beams for bending, Shear force and bending moment diagrams in beams & Section method, Shearing stresses in beams, Principal Stresses and Strains, Yield Criteria, Deflection of Beams – Integration Method, Deflection of Beams – Method of superposition, Columns, Strain energy concept, Impact loading. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Stress, deformation and strain phenomena are covered in this fundamental course constructing a basis for the future mechanics-related courses such as; Machine elements, Elasticity, Mechanics of Composite Materials etc. | 1,2,3,6,7,8,9 | 1, 2, 5, 8, 10, 11, 13 | A |

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| **Main Textbook** | Beer F.P. et al., 2009, Mechanics of Materials, McGraw-Hill. |
| **Supporting References** | Hibbeler R.C., 1997, Mechanics of Materials, Pearson Prentice-Hall Inc. |
| **Necessary Course Material** | Course notes |

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| **Course Schedule** | |
| **1** | Concept of Stress |
| **2** | Concept of Strain and Deformation |
| **3** | Poisson’s Ratio and Bulk modulus |
| **4** | Torsion |
| **5** | Analysis of beams for bending |
| **6** | Shear force and bending moment diagrams in beams & Section method |
| **7** | Shearing stresses in beams |
| **8** | Mid-Term Exam |
| **9** | Principal Stresses and Strains |
| **10** | Yield Criteria |
| **11** | Deflection of Beams – Integration method |
| **12** | Deflection of Beams – Method of superposition |
| **13** | Columns |
| **14** | Strain energy concept |
| **15** | Impact loadings |
| **16,17** | Final Exam |

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| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 4 | 56 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 3 | 42 |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 35 | 35 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 35 | 35 |
|  | **Total workload** | | **172** |
|  | **Total workload / 30** | | **5.73** |
|  | **Course ECTS Credit** | | **6** |

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| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| **Final Exam** | 60 |
| **Total** | 100 |

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| **RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES (PO)** (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low) | | |
| **NO** | **PROGRAM OUTCOME** | **Contribution** |
| **1** | Sufficient knowledge of engineering subjects related with mathematics, science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of mechanical engineering problems. | 5 |
| **2** | Ability to determine, define, formulate and solve complex mechanical engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods. | 3 |
| **3** | Ability to design a complex system, a component and/or an engineering process under real life constrains or conditions, defined by environmental, economical and political problems; for that purpose an ability to apply modern design methods. | 3 |
| **4** | Ability to develop, select and use modern methods and tools required for mechanical engineering applications; ability to effective use of information technologies. | 1 |
| **5** | In order to investigate mechanical engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results. | 1 |
| **6** | Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence. | 3 |
| **7** | Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language. | 5 |
| **8** | Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement. | 3 |
| **9** | Understanding of professional and ethical issues and taking responsibility | 3 |
| **10** | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | 1 |
| **11** | Knowledge of actual problems and effects of engineering applications on health, environment and security in global and social scale; an awareness of juridical results of engineering solutions. | 1 |

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| **LECTUTER(S)** | | | |
| **Prepared by** | Assoc. Prof. Dr. Onur Arslan |  |  |
| **Signature(s)** |  |  |  |

**Date:** 10.07.2024