**ESOGU MECHANICAL ENGINEERING DEPARTMENT**

**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| KOMPOZİT MALZEMELER MEKANİĞİNE GİRİŞ | 151818692 |

|  |  |  |
| --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | **ECTS** |
| **Theory** | **Practice** |
| 8 | 3 | 0 | 5 |

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

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | -- |
| **Objectives of the Course** | Composite materials are among advance materials which are effectively utilized in aerospace and automotive industry. This course leads students in learning about composite materials and designing parts by using such materials. Moreover, this course provides students with sufficient knowledge in solid mechanics. |
| **Short Course Content** | This course investigates general structure of composite materials, production techniques, mechanical behavior and failure criteria of composite materials. In order to teach the classical lamination theory better, anisotropic elasticity is also covered within this course. |

|  |  |  |  |
| --- | --- | --- | --- |
| **Learning Outcomes of the Course** | **Contributed PO(s)**  | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Having knowledge about design and production techniques of composite materials which are commonly used in engineering applications. | 1,2,3,4,5,6,7,8,9 | 1, 2, 5, 8, 10, 11, 13 | A |

|  |  |
| --- | --- |
| **Main Textbook** | Jones R.M., 1999, Mechanics of Composite Materials, Taylor and Francis. |
| **Supporting References** | Kaw A.K., 2006, Mechanics of Composite Materials, Taylor and Francis. |
| **Necessary Course Material** | Course notes |

|  |
| --- |
| **Course Schedule** |
| **1** | Components of composite materials |
| **2** | Open-mold production techniques |
| **3** | Closed-mold production techniques |
| **4** | Index notation in elasticity |
| **5** | Vector and tensor transformations |
| **6** | Constitutive relations in anisotropic materials |
| **7** | Constitutive relations in ortotropic materials under plane-stress assumption |
| **8** | Mid-Term Exam |
| **9** | Constitutive relations in a composite lamina |
| **10** | Thermal and hygroscopic effects in constitutive relations of a composite lamina |
| **11** | Micro-mechanical behavior of a composite lamina |
| **12** | Classical laminate theory  |
| **13** | Transverse shear stresses and shear correction factor in laminates |
| **14** | Failure criteria |
| **15** | Progressive failure analyses |
| **16,17** | Final Exam |

|  |
| --- |
| **Calculation of Course Workload** |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 3 | 42 |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 25 | 25 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 25 | 25 |
|  | **Total workload** | **124** |
|  | **Total workload / 30** | **4.6** |
|  | **Course ECTS Credit** | **5** |

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

|  |
| --- |
| **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. | 5 |
| **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. | 4 |
| **4** | Ability to develop, select and use modern methods and tools required for mechanical engineering applications; ability to effective use of information technologies. | 3 |
| **5** | In order to investigate mechanical engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results. | 4 |
| **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. | 3 |
| **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 |

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

**Date:**03.07.2024