**ESOGU MECHANICAL ENGINEERING DEPARTMENT**

**COURSE INFORMATION FORM**

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| **Course Name** | **Course Code** |
| FUNDAMENTALS OF ELECTRIC AND ELECTRONICS | 151813355 |

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

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| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  | 3 |  |  |  |

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

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| **Prerequisite(s) if any** | None |
| **Objectives of the Course** | 1. Providing basic information about electricity, electronic components, power, energy, solar cells and electrical machinery 2. Providing basic information about electrical safety |
| **Short Course Content** | Basic concepts, resistive circuits, resistivity, Kirchhoff's current and voltage laws, Electric power and energy, nodal analysis, mesh analysis, Thevenin Equivalent, Maximum Power Transfer, operational amplifiers, first order circuits, second order circuits, frequency domain analysis, active and reactive power, Semiconductors and pn-junctions, Transistors, Solar cells, Electric Motors, and Electrical safety |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Ability to analyze resistive and first order electric circuits | X | 1, 5, 10,11 | A |
| **2** | Ability to analyze ac RLC circuits | X | 1, 5, 10,11 | A |
| **3** | Understanding of semiconductor switches and solar cells. | X | 1, 5, 10,11 | A |
| **4** | Basic information about electric motors and electric safety. | X | 1, 5, 10,11 | A |
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| **6** |  |  |  |  |
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| **Main Textbook** | Bobrow, L S., “Fundamentals of Electrical Engineering”, Rinehart and Winston, Inc. 1985. |
| **Supporting References** | Any circuit analysis book |
| **Necessary Course Material** | None |

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| **Course Schedule** | |
| **1** | Importance of electricity and electronics in engineering, Basic concepts, Electric Current |
| **2** | Sources, Ohm's Law, resistivity, Kirchhoff's current law, Electric power and energy |
| **3** | Nodal analysis |
| **4** | Kirchhoff's voltage law, mesh analysis |
| **5** | Thevenin and Norton Equivalents, Maximum Power Transfer, operational amplifiers |
| **6** | Inductance, Capacitance, first order circuits |
| **7** | Second order circuits, frequency domain analysis, impedance, active and reactive power |
| **8** | Mid-Term Exam |
| **9** | Semiconductors and pn-junctions |
| **10** | Diode circuits, Transistors |
| **11** | Transistor as a switch |
| **12** | Solar cells |
| **13** | Electric Motors |
| **14** | Electrical safety |
| **15** | Review |
| **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 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
| Homework | 0 | 0 | 0 |
| Quiz Exam | 0 | 0 | 0 |
| Studying for Quiz Exam | 0 | 0 | 0 |
| Oral exam | 0 | 0 | 0 |
| Studying for Oral Exam | 0 | 0 | 0 |
| Report (Preparation and presentation time included) | 0 | 0 | 0 |
| Project (Preparation and presentation time included) | 0 | 0 | 0 |
| Presentation (Preparation time included) | 0 | 0 | 0 |
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| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 14 | 2 | 28 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 14 | 2 | 28 |
|  | **Total workload** | | **128** |
|  | **Total workload / 30** | | **4.26** |
|  | **Course ECTS Credit** | | **4** |

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| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Quiz |  |
| Homework |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **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 Mechanical engineering; an ability to apply theoretical and practical knowledge on solving and modeling of Mechanical engineering problems. | 3 |
| **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, economic 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 | 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. | 3 |
| **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 | 1 |
| **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 | 1 |
| **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** |  |  |  |  |
| **Signature(s)** |  |  |  |  |

**Date:**06.06.2024