



**ESOGU ELECTRICAL - ELECTRONICS ENGINEERING DEPARTMENT
COURSE INFORMATION FORM**

| Course Title | Course Code |
|----------------------|---------------------|
| ELECTRICAL MACHINERY | 151228549-151248549 |

| Semester in Program | Number of Course Hours per Week | | ECTS |
|---------------------|---------------------------------|----------|------|
| | Theory | Practice | |
| 8 | 3 | 2 | 7 |

| Course ECTS Credit Distribution | | | | |
|---------------------------------|----------------------|--------|-------------------|--------|
| Basic Sciences | Engineering Sciences | Design | General Education | Social |
| | 4 | | | |

| Language of Instruction | Course Level | Course Type |
|-------------------------|---------------|-------------|
| English | Undergraduate | Elective |

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|---------------------------------|---|
| Prerequisite | |
| Objectives of the Course | To learn the constructional features of electrical machines and the operational principles and characteristics of electrical machines used in industrial applications under varying load conditions. To know the solution methods in order to solve problems related with the electrical machines. |
| Brief Course Content | Basic concepts of rotating machines. DC generators and motors. Induction motors. Synchronous generators. Special electrical machines. Experiments related with electrical machines will be carried out. Reports including operational characteristics of the generators and motors, and efficiency calculations will be prepared. |

| Learning Outcomes of the Course | Contributed POs | Teaching Methods * | Assessment Methods ** |
|---|-----------------|--------------------|-----------------------|
| 1 Students will learn the theory of electrical machines | 2 | Lecture-Experiment | Exam |
| 2 Students will analyze the electrical machines. | 4 | Lecture-Experiment | Exam |
| 3 Students will solve the problems related with the electrical machines | 5 | Lecture-Experiment | Exam |
| 4 Students will learn the structures of the electrical machines by observing them | 2 | Lecture-Experiment | Exam |
| 5 Students will investigate the operations of electrical machines under varying load conditions on the characteristics | 5 | Lecture-Experiment | Exam |
| 6 Students will learn the properties of the systems which work the electrical machines and they will be familiar with them. | 4 | Lecture-Experiment | Exam |
| 7 | | | |
| 8 | | | |

***Teaching Methods** 1:Lecture, 2:Discussion, 3:Experiment, 4:Simulation, 5:Question-Answer, 6:Tutorial, 7:Observation, 8:Case Study, 9:Technical Visit, 10:Problem Solving, 11:Individual Work, 12:Team/Group Work, 13:Brain Storm, 14:Project Design / Management, 15:Report Preparation and/or Presentation

****Assessment Methods** A:Exam, B:Quiz, C:Oral Exam, D:Homework, E:Report, F:Article Examination, G:Presentation, I:Experimental Skill, J:Project Observation, K:Class Attendance; L:Jury Exam

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| Main Textbook | Stephen j. Chapmen ;Electric machinery fundamental. |
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|----------------------------------|---|
| Supplementary Resources | M. Kostenko and L. Piotrovsky, Electrical Machines. O.I. Elgerd, Basic Electric Power Engineering. Hindmarsh, Electrical Machines and Their Applications. |
| Necessary Course Material | |

| Course Weekly Schedule | |
|-------------------------------|---|
| 1 | Basic concepts of dc, induction and synchronous machines |
| 2 | Expression of voltages generated on dc and ac generators |
| 3 | DC generators(Lab:Investigation of the load characteristics of a dc shunt generator) |
| 4 | DC motors(Lab:Investigation of the load characteristics of a dc compound generator) |
| 5 | Speed control of dc motors |
| 6 | Constructional features and operational principles of induction machines(Lab:Investigation of the load characteristics of a dc shunt motor) |
| 7 | Derivation of equivalent circuit of induction machines(Lab:Investigation of the load characteristics of a dc compound motor) |
| 8 | Mid-Term Exams |
| 9 | Analysis of induction motors(Lab:Investigation of the load characteristics of squirrel cage induction motor) |
| 10 | Starting and speed control methods of induction motors(Lab:Investigation of the load characteristics of wound rotor induction motor) |
| 11 | Calculation of parameters in the equivalent circuit of synchronous machines |
| 12 | Regulation and efficiency in the synchronous machines |
| 13 | Regulation and efficiency in the synchronous machines |
| 14 | Special electrical machines |
| 15 | Special electrical machines |
| 16,17 | Final Exams |

| Calculation of Course Workload | | | |
|---|--------------|----------------------------|------------------------------|
| Activities | Count | Time (Hour) | Total Workload (Hour) |
| Weekly classroom time | 14 | 5 | 70 |
| Weekly study time (review, reinforcing, preparation) | 14 | 7 | 98 |
| Homework | | | |
| Taking a quiz | | | |
| Studying for a quiz | | | |
| Oral exam | | | |
| Studying for an oral exam | | | |
| Report writing (Preparation and presentation time included) | | | |
| Project (Preparation and presentation time included) | | | |
| Presentation (Preparation time included) | | | |
| | | | |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 8 | 8 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 10 | 10 |
| | | Total workload | 190 |
| | | Total workload / 30 | 6.33 |
| | | Course ECTS Credit | 7 |

| Assessment | |
|--------------------|-----|
| Activity Type | % |
| Mid-term | 35 |
| Experimental Skill | 15 |
| Homework | |
| Bir öge seçin. | |
| Bir öge seçin. | |
| Final Exam | 50 |
| Total | 100 |

| COURSE CONTRIBUTION TO THE PROGRAM OUTCOMES (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low) | | |
|--|--|--------------|
| NO | PROGRAM OUTCOMES | Contribution |
| 1 | a. Sufficient knowledge of mathematics | |
| | b. Sufficient knowledge of basic sciences | |
| | c. Sufficient basic engineering and Electrical-Electronics engineering knowledge | 3 |
| | d. Skill of applying all these knowledge and experience to complicated Electrical-Electronics engineering problems | 3 |
| 2 | Skill of defining, identifying, formulating and solving the complicated problems in Electrical-Electronics engineering and related areas by applying appropriate analysis and modelling methods. | 4 |
| 3 | Skill of designing a complicated process, system, equipment or product by applying modern design methods under realistic constraints and conditions. | |
| 4 | To analyze and solve the complicated engineering problems: | 3 |
| | a. skill of developing, selecting and applying the required techniques and devices | |
| | b. skill of using information technologies effectively | |
| 5 | To study the complicated on the complicated Electrical-Electronics engineering problems and research subjects: | 4 |
| | a. skill of experimental design | |
| | b. skill of performing the experiments, collecting the data and analyzing and interpreting the results | |
| 6 | a. Skill of performing individual studies | |
| | b. Skill of performing intra and interdisciplinary and multidisciplinary teamwork and studies | |
| 7 | a. Skill of effective oral and writing communication in Turkish | |
| | b. Skill of improving and using foreign language knowledge | |
| | c. Skill of effective reporting, understanding the reports and preparing the design and production reports | |
| | d. Skill of effective presentation and giving and getting clear and understandable instructions. | |
| 8 | Awareness of the necessity of life-long learning and skill of accessing to information and following the improvements in contemporary science and technology | |
| 9 | a. Awareness of necessity of behaving in accordance with the ethical principles and awareness of the importance of having professional ethical responsibilities | |
| | b. Knowledge about legal regulations and standards of engineering | |
| 10 | a. Knowledge about project management, risk management and change management | |
| | b. Awareness of the significance of entrepreneurship and innovation | |

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| | c. Knowledge about sustainable development | |
| 11 | Knowledge about the effects of engineering applications and practices on the global and social health, ecology and safety, knowledge about the current problems in relation to the working areas of Electrical-Electronics engineering; and awareness of the legal issues resulting from engineering solutions | |
| 12 | Knowledge about modern problems in local and universal scale | |

| LECTURER(S) | | | | |
|---------------------|--------------------------------|--|--|--|
| Prepared by | Assoc.Prof.Dr.Atabak NAJAFI | | | |
| Signature(s) | | | | |

Date:06.07.2024