**ESOGU** **MECHANICAL ENGINEERING DEPARTMENT**

**COURSE INFORMATION FORM**

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| **Course Name** | **Course Code** |
| Combined Heat Power Systems | 151818492 |

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

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

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

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| **Prerequisite(s) if any** | - |
| **Objectives of the Course** | Combined heat and power systems to understand the basic components with the basic concepts and parameters, learn the ways of the electrical distribution system how to reducing the load, Having taken into account the selection criteria for the system to use the information. |
| **Short Course Content** | Combined Heat Power Generation (Cogeneration), Basic Components of a Combined Heat Power Systems, Combined Heat Power Generation System Selection, Combined heat and power types, autoproduction and application examples. |

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| **Learning Outcomes of the Course** | **Contributed PO(s)**  | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Students gain knowledge to recognize combined heat power systems  | 2,4,6,7,11 | 2, 11, 15  | D, G  |
| **2** | Decide how the upper and lower cycles of the system can be designed | 2,4,6,7,11 | 2,11, 15  | D, G |
| **3** |  |  |  |  |
| **4** |  |  |  |  |
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| **6** |  |  |  |  |

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| **Main Textbook** | Moran M.J and Shapiro H.N., Fundementals of Engineering Thermodynamics., John Wiley&Sons, Inc., Fifth Edition., 2006., USA. |
| **Supporting References** | Termodinamik Mühendislik Yaklaşımıyla., Çeviri Editörü Ali Pınarbaşı., Çenhel Y.A ve Boles M.A., Güven Bilimsel, Beşinci Baskı.,2008., İzmir |
| **Necessary Course Material** | - |

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| **Course Schedule** |
| **1** | Introduction to combined heat power systems |
| **2** | Gas turbine cycles |
| **3** | Gas turbine cycles |
| **4** | Steam power cycles |
| **5** | Steam power cycles |
| **6** | Cogeneration systems |
| **7** | Cogeneration systems |
| **8** | Mid-Term Exam |
| **9** | Trigeneration systems |
| **10** | Trigeneration systems |
| **11** | Combined cycle power plants |
| **12** | Investment models |
| **13** | Autoproduction |
| **14** | Project Presentations |
| **15** | Project Presentations |
| **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 | 1 | 14 |
| Homework | 1 | 28 | 28 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam  |  |  |  |
| Studying for Oral Exam  |  |  |  |
| Report (Preparation and presentation time included) | 1 | 28 | 28 |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) | 1 | 28 | 28 |
| Mid-Term Exam |  |  |  |
| Studying for Mid-Term Exam |  |  |  |
| Final Exam | - | - | - |
| Studying for Final Exam | - | - | - |
|  | **Toplam iş yükü** | **140** |
|  | **Toplam iş yükü / 30** | **4,666** |
|  | **Dersin AKTS Kredisi** | **5** |

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| **Evaluation** |
| **Activity Type** | **%** |
| Homework | 40 |
| Presentation | 60 |
| **Final Exam (Report)** |  |
| **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 to mathematics, science and own branch; an ability to apply theoretical and practical knowledge on solving and modeling of engineering problems. | 3 |
| **2** | Ability to determine, define, formulate and solve complex 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 constraints or conditions, defined by environmental, economic 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 engineering applications; ability to effectively use information technologies. | 5 |
| **5** | To investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpret experimental results. | 1 |
| **6** | Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence. | 5 |
| **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 | 2 |
| **10** | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | 4 |
| **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. | 5 |

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| **LECTUTER(S)** |
| **Prepared by** | Prof. Dr. Haydar ARAS  | - | - | - |
| **Signature(s)** |  |  |  |  |

**Date:** 17.11.2024