**ESOGU MECHANICAL ENGINEERING DEPARTMENT**

**COURSE INFORMATION FORM**

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| **Course Name** | **Course Code** |
| Thermal Turbomachinery | 151817639 |

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| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| 7 | 3 | 0 | 5 |

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| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
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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** | Teaching the principles of Thermal Turbo Machines and their applications in Mechanical Engineering Programme in Technology Faculty. |
| **Short Course Content** | Definition of Thermal Turbo machines, one-dimensional isentropic flow, the nozzle flow, Axial flow turbine and compressor, Radial flow turbine and compressor, turbojet, turbofan, turboprop and turboshaft engines. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Turbomachinery, general definitions, classifications, will be familiar with basic dimensions | 1,2,5 | 1,11 | D |
| **2** | Thermal turbo machines, classes, and knows the area of use. | 1,2,5 | 1,11 | D |
| **3** | For subsonic and supersonic flows, like nozzle and diffuser design elements can made | 1,2,5 | 1,11 | D |
| **4** | Turbojet, turbofan, turboprop and turboshaft engines are known and can be learnt calculation. | 1,2,5 | 1,11 | D |
| **5** | Have a basic knowledge on the use of thermal turbo machines at heat and power plants. | 1,2,5 | 1,11 | D |
| **6** |  |  |  |  |
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| **Main Textbook** | Fluid Mechanics and Thermodynamics of Turbomachinery, Sixth Edition., S.L. Dixon and C.A. Hall Published by Elsevier, 2010. Gas Turbine Theory, H. Cohen, GFC Rogers, HIH Saravanamuttoo, Longman Group Limited, 1996 |
| **Supporting References** | Turbomakinelerde Akış: Turbomakinelerin Termodinamiği ve Akışkanlar Mekaniği, E. Öztürk, Birsen Yayınevi, 1997, İstanbul. Örneklerle Termik Turbo Makinaların Prensipleri, N. Kayansayan, DEÜ, 1986, İzmir. |
| **Necessary Course Material** |  |

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| **Course Schedule** | |
| **1** | Compressible flow |
| **2** | One dimensional isentropic flow |
| **3** | Converging and diverging nozzles |
| **4** | Basic angular momentum considerations in turbomachines |
| **5** | Pums, fans and compressors |
| **6** | Turbines |
| **7** | The ideal cycle for gas turbine engines |
| **8** | Mid-Term Exam |
| **9** | The Real cycle for gas turbine engines |
| **10** | Applications of gas turbines in power cycles |
| **11** | Ideal jet propulsion cycles |
| **12** | Turbojet engines |
| **13** | Turboprop engines |
| **14** | Turbofan engines |
| **15** | Turboshaft engines |
| **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 | 3 | 42 |
| Homework | 3 | 20 | 60 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
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| Mid-Term Exam |  |  |  |
| Studying for Mid-Term Exam |  |  |  |
| Final Exam |  |  |  |
| Studying for Final Exam |  |  |  |
|  | **Total workload** | | **144** |
|  | **Total workload / 30** | | **4.8** |
|  | **Course ECTS Credit** | | **5** |

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| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term |  |
| Quiz |  |
| Homework | 100 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** |  |
| **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  engineering problems. | 5 |
| **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. | 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. |  |
| **4** | Ability to develop, select and use modern methods and tools required for engineering applications; ability to effective use of information technologies. |  |
| **5** | In order to investigate 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. |  |
| **7** | Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language. |  |
| **8** | Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement. |  |
| **9** | Understanding of professional and ethical issues and taking responsibility |  |
| **10** | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. |  |
| **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. |  |

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| **LECTUTER(S)** | | | | |
| **Prepared by** | Prof. Dr. Mesut TEKKALMAZ |  |  |  |
| **Signature(s)** |  |  |  |  |

**Date:**18.11.2024