**ESOGU MECHANICAL ENGINEERING DEPARTMENT**

**COURSE INFORMATION FORM**

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| **Course Name** | **Course Code** |
| HEATING | 151817429 |

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

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| **Prerequisite(s) if any** |  |
| **Objectives of the Course** | The aim of the course is for the student taking the course to gain the ability to recognize, interpret, design and project various heating systems. |
| **Short Course Content** | Heating techniques, total heat transfer coefficient calculation, sweating and condensation control in buildings, thermal comfort, thermal insulation calculation, heat loss calculation, hot water heating installation, radiator calculation, circulation pump selection, pipe diameter calculation, boiler calculation, floor heating. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Becoming aware of heating systems | 3, 6, 11 | 1 | 1 |
| **2** | Calculation of the total heat transfer coefficient in a multilayer wall | 3, 6, 11 | 1, 10 | 1 |
| **3** | Ability to control sweating and condensation in buildings | 3, 6, 11 | 1, 10 | 1 |
| **4** | Ability to make thermal insulation projects and check compliance with standards | 3, 6, 11 | 1, 10 | 1 |
| **5** | Understanding the importance of building wall temperature for thermal comfort and establishing its relationship with thermal insulation | 3, 6, 11 | 1, 10 | 1 |
| **6** | Ability to calculate heat loss of a building and determine its heat generating capacity | 3, 6, 11 | 1, 10 | 1 |
| **7** | Making a hot water heating installation project | 3, 6, 11 | 1, 10 | 1 |
| **8** | Ability to calculate pipe diameter in heating installation, determine pressure losses, determine circulation pump capacity | 3, 6, 11 | 1, 10 | 1 |
| **9** | Hot water preparation boiler calculation | 3, 6, 11 | 1, 10 | 1 |
| **10** | Ability to create underfloor heating projects | 3, 6, 11 | 1, 10 | 1 |

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| **Main Textbook** | Kalorifer Tesisatı, MMO 352/7 |
| **Supporting References** | Isısan No 153 Kalorfier Tesisatı, Yalıtım MMO /2005/399 |
| **Necessary Course Material** |  |

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| **Course Schedule** | |
| **1** | Heating techniques |
| **2** | Calculation of the total heat transfer coefficient in a multilayer wall |
| **3** | Sweating and condensation control in buildings |
| **4** | thermal comfort |
| **5** | Thermal insulation calculation |
| **6** | Thermal insulation calculation |
| **7** | Thermal insulation calculation |
| **8** | Mid-term Exam |
| **9** | Hot water heating installation, heat loss calculation |
| **10** | Hot water heating installation, heat loss calculation |
| **11** | heat loss calculation, radiator calculation |
| **12** | Circulation pump selection, pipe diameter calculation |
| **13** | Boiler calculation, expansion tank, security pipes |
| **14** | Floor heating project |
| **15** | Floor heating project |
| **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 | 5 | 70 |
| 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 |
| Mid-Term Exam | 1 | 2 | 1 |
| Studying for Mid-Term Exam | 1 | 14 | 14 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 14 | 14 |
|  | **Total workload** | | **143** |
|  | **Total workload / 30** | | **4,766666667** |
|  | **Course ECTS Credit** | | **5** |

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| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Quiz |  |
| Homework |  |
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| 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 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  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 method  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 method  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 method | 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 | 5 |
| **4** | Ability to develop, select and use modern methods and tools required for engineering applications; ability to effective use of information technologies  In order to investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results. | 3 |
| **5** | In order to investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results.  Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence | 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  Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement  Awareness of life-long learning; ability to reach information; follow developments in sc | 1 |
| **8** | Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement | 5 |
| **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 | 5 |
| **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** | Assoc. Prof. Nihal Uğurlubilek |  |  |  |
| **Signature(s)** |  |  |  |  |

**Date:**06.06.2024