**ESOGU AERONAUTICAL ENGINEERING DEPARTMENT**

**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Heat Transfer | **152415002** |

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

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

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

|  |  |
| --- | --- |
| **Prerequisite(s) if any** |  |
| **Objectives of the Course** | Understanding the physical mechanisms that are the basic of heat transfer types and the derivation of the basic equations and and create a method in order to calculate the energy transferred per unit of time. |
| **Short Course Content** | Concepts of heat conduction, heat convection and heat radiation. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Define the heat transfer mechanisms | 1, 2, 4, 6 | 1, 2, 5, 8, 10 | A, B, D, E |
| **2** | Examine the heat properties of the system and the surrounding. | 1, 2, 4, 6 | 1, 2, 5, 8, 10 | A, B, D, E |
| **3** | Have an ability to solve the steady and unsteady conduction heat transfer. | 1, 2, 4, 6 | 1, 2, 5, 8, 10,13 | A, B, D, E |
| **4** | Have an ability to solve the steady and unsteady convection heat transfer. | 1, 2, 4, 6 | 1, 2, 5, 8, 10,13 | A, B, D, E |
| **5** | Have an ability to solve the radiative heat transfer. | 1, 2, 4, 6 | 1, 2, 5, 8, 10,13 | A, B, D, E |
| **6** |  |  |  |  |
| **7** |  |  |  |  |
| **8** |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Main Textbook** | Identifies dimensionless parameters employed in fluid mechanics. |  | 1, 2, 5, 8, 10 | A, B, D, E |
| **Supporting References** | F. P. Incorpera, D. P. DeWitt, T. L. Bergman, and A. S. Lavine, “Fundamentals of Heat and Mass Transfer-6th Edition”, John Wiley, New York, 2006. |
| **Necessary Course Material** | Projector, computer, textbook, A4 notebook, pencil, eraser, ruler, calculator |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Introduction to heat conduction, fundamentals of conduction, convection, and radiation |
| **2** | One dimensional heat conduction in steady state |
| **3** | One dimensional heat conduction in steady state |
| **4** | Fins |
| **5** | Transient heat conduction |
| **6** | Introduction to heat convection |
| **7** | External Flow |
| **8** | Mid-Term Exam |
| **9** | External Flow, Internal Flow |
| **10** | Internal Flow |
| **11** | Natural convection |
| **12** | Introduction to radiation, basic methods, and properties |
| **13** | Radiation heat transfer exchange between surfaces |
| **14** | Radiation heat transfer exchange between surfaces |
| **15** | General Review |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **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,….) |  |  |  |
| Homework | 14 | 3 | 42 |
| Quiz Exam | 5 | 10 | 50 |
| Studying for Quiz Exam | 5 | 1 | 5 |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (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 | 5 | 5 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 5 | 5 |
|  | **Total workload** | | **153** |
|  | **Total workload / 30** | | **5,1** |
|  | **Course ECTS Credit** | | **5** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 15 |
| Quiz | 20 |
| Homework | 20 |
| Report | 15 |
|  |  |
| **Final Exam** | 30 |
| **Total** | 100 |

|  |  |  |
| --- | --- | --- |
| **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. | 5 |
| **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. | 3 |
| **4** | Ability to develop, select and use modern methods and tools required for engineering applications; ability to effective use of information technologies. | 3 |
| **5** | In order to investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results. | 5 |
| **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. | 2 |
| **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 | 3 |
| **10** | Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development. | 2 |
| **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. | 2 |
| **12** |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **LECTUTER(S)** | | | | |
| **Prepared by** | Prof. Dr. Kürşad Melih GÜLEREN |  |  |  |
| **Signature(s)** |  |  |  |  |

**Date:** 10.07.2024