**ESOGU MECHANICAL ENGINEERING DEPARTMENT**

**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Fluid Mechanics | 151815346 |

|  |  |  |  |
| --- | --- | --- | --- |
| **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** |
|  | 3 |  |  |  |

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

|  |  |
| --- | --- |
| **Prerequisite(s) if any** |  |
| **Objectives of the Course** | To introduce basic properties and importance of fluids in engineering applications. To teach and apply basic methods employed for analysis of engineering problems involving fluids. |
| **Short Course Content** | Introductory theories and definitions, Fluid Statics, Bernoulli equation, Extended Bernoulli equation (Energy equation), Engineering applications of Bernoulli equation, Momentum theorems, Flow analysis on inner and outer pipe surfaces, Laminar and turbulent boundary layers, Differential flow analysis. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Has knowledge about the basic properties of fluids and the basic concepts of fluid mechanics. | 1,2,6 | 1,11 | A |
| **2** | Can derive and apply the fundamental equation of fluid statics and determine the hydrostatic force acting on immersed surfaces. | 1,2,6 | 1,11 | A |
| **3** | Can derive and apply the conservation equations of mass, momentum, energy and angular momentum. | 1,2,6 | 1,11 | A |
| **4** | Can analyze incompressible flow in pipes and closed conduits. | 1,2,6 | 1,11 | A |
| **5** |  |  |  |  |
| **6** |  |  |  |  |
| **7** |  |  |  |  |
| **8** |  |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Çengel Y., Cimbala J.M., “Fluid Mechanics Fundamentals and Applications”, McGraw-Hill Book Company, Third edition |
| **Supporting References** | Frank M. White, “ Fluid Mechanics ”, McGraw-Hill Book Company, 2003. |
| **Necessary Course Material** |  |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Introduction and Basic Concepts |
| **2** | Properties of Fluids |
| **3** | Presure and Fluid Statics |
| **4** | Presure and Fluid Statics |
| **5** | Presure and Fluid Statics |
| **6** | Fluid Kinematics |
| **7** | Bernoulli and Energy Equations |
| **8** | Mid-Term Exam |
| **9** | Momentum Analysis of Flow Systems |
| **10** | Momentum Analysis of Flow Systems |
| **11** | Internal Fow |
| **12** | Internal Fow |
| **13** | Internal Fow |
| **14** | External Flow |
| **15** | Differantial Analysis of Fluid Flow |
| **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,….) | 14 | 3 | 42 |
| Homework |  |  |  |
| 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) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 28 | 28 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 28 | 28 |
|  | **Total workload** | | **148** |
|  | **Total workload / 30** | | **4.8** |
|  | **Course ECTS Credit** | | **5** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 50 |
| Quiz |  |
| Homework |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 50 |
| **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. |  |
| **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. |  |
| **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. |  |
| **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. |  |

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

**Date:**18.11.2024