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

**COURSE INFORMATION FORM**

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| **Course Name** | **Course Code** |
| Statistics | **151816364** |

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| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| 6 | 2 | 0 | 3 |

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| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
| 2 |  |  |  |  |

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

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| **Prerequisite(s) if any** |  |
| **Objectives of the Course** | 1. Use statistical methodology and tools in the engineering problem-solving process. 2. Compute and interpret descriptive statistics using numerical and graphical techniques. 3. Understand the basic concepts of probability, random variables, probability distribution, and joint probability distribution. 4. Compute point estimation of parameters, explain sampling distributions, and understand the central limit theorem. 5. Construct confidence intervals on parameters for a single sample. |
| **Short Course Content** | This course covers the fundamental concepts of statistics and probability models used in analysis of engineering problems. Topics include discrete random variables and probability distributions, continuous random variables and probability distributions, joint probability distributions, random sampling and data description, point estimation of parameters, statistical intervals for a single sample, and tests of hypotheses for a single sample. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Students analyze and interpret the collected data and choose and use appropriate statistical methods in a decision-making process. | 1,2,3,5,10,11 | 1, 5, 8 | A |
| **2** | They can analyze discrete and continuous random variables. | 1,2,3,5,10,11 | 1, 5, 8 | A |
| **3** | They can find the expected value and standard deviations of commonly used distributions and solve related problems | 1,2,3,5,10,11 | 1, 5, 8 | A |
| **4** |  |  |  |  |
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| **7** |  |  |  |  |
| **8** |  |  |  |  |

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| **Main Textbook** | Montgomery and Runger, Applied Statistics and Probability for Engineers, John Wiley and Sons, Inc. 3rd. edition 2003. |
| **Supporting References** | 1) Walpole, Myers, Myers, Ye, Probability and Statistics for Engineers and Scientists, Pearson 9th edition, 2012.  2) Sheldon Ross, A First Course in Probability, Prentice Hall, 7th edition, 2006 |
| **Necessary Course Material** |  |

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| **Course Schedule** | |
| **1** | Basic statistical concepts and the role of statistics in the engineering problem solving process |
| **2** | Probability, sample space and events |
| **3** | Conditional probability, multiplication and total probability rules |
| **4** | Bayes' theorem and random variables |
| **5** | Discrete random variables and probability distributions |
| **6** | Discrete uniform distribution, Binomial distribution |
| **7** | Geometric and Negative Binomial distribution |
| **8** | Mid-Term Exam |
| **9** | Hypergeometric distribution, Poisson distribution |
| **10** | Continuous random variables and probability distributions |
| **11** | Normal Distribution |
| **12** | Normal Approximation to the Binomial and Poisson Distribution |
| **13** | Exponential distribution |
| **14** | Erlang and Gamma distributions |
| **15** | Joint Probability Distribution |
| **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 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| 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) |  |  |  |
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| Mid-Term Exam | 1 | 1.5 | 1.5 |
| Studying for Mid-Term Exam | 1 | 20 | 20 |
| Final Exam | 1 | 1.5 | 1.5 |
| Studying for Final Exam | 1 | 20 | 20 |
|  | **Total workload** | | 85 |
|  | **Total workload / 30** | | 2,83 |
|  | **Course ECTS Credit** | | 3 |

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| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Quiz |  |
| Homework |  |
| Bir öğe seçin. |  |
| 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 Mechanical engineering; an ability to apply theoretical and practical knowledge on solving and modeling of Mechanical engineering problems. | 5 |
| **2** | Ability to determine, define, formulate and solve complex Mechanical 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, economic 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 Mechanical engineering applications; ability to effective use of information technologies | 3 |
| **5** | In order to investigate Mechanical 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 | 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. | 3 |
| **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. | 3 |

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| **LECTUTER(S)** | | | | |
| **Prepared by** | Prof. Dr. Hasan Kıvanç Aksoy |  |  |  |
| **Signature(s)** |  |  |  |  |

**Date:**06.06.2024