**ESOGU AERONAUTICAL ENGINEERING DEPARTMENT**

**COURSE INFORMATION FORM**

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| **Course Name** | **Course Code** |
| **MECHANICAL VIBRATIONS** | **152416005** |

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| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| 6 | 3 | 0 | 4 |

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

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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** | The objective of the course is to provide the student with the ability to model mechanical systems and determine their natural frequencies, grasping the basics of the theory of vibration isolation. |
| **Short Course Content** | Kinetics of vibration, single-degree of freedom system, vibration isolation, two degrees of freedom system, dynamic vibration absorber, multi-degree of freedom system,torsional vibration. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Identifying the problems of Mechanical Systems. | 1, 2 | 1, 11 | A |
| **2** | Analyzing the problems by using necessary formulas. | 2, 3 | 1, 11 | A |
| **3** | Evaluating the mechanical vibration results. | 2, 3 | 1, 11 | A |
| **4** | Evaluating the solution by considering the calculations. | 3, 4 | 1, 11 | A |
| **5** | Applying the vibration isolation theory. | 5, 6 | 1, 11 | A |
| **6** |  |  |  |  |
| **7** |  |  |  |  |
| **8** |  |  |  |  |

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| **Main Textbook** | Mechanical Vibrations Lecture Notes, Prof.Dr. Zeki Kıral |
| **Supporting References** | 1. Rao, S. S. Mechanical Vibrations. 3rd ed. Addison Wesley, 1995.  2. Beer, Ferdinand Pierre. Vector Mechanics for Engineers. McGraw-Hill, 1988.  3. Williams, James H., Jr. Fundamentals of Applied Dynamics. John Wiley & Sons, Inc., 1996. |
| **Necessary Course Material** | - |

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| **Course Schedule** | |
| **1** | Kinetics of vibration |
| **2** | Single-degree of freedom systems |
| **3** | Rayleigh method |
| **4** | Undamped vibration problems |
| **5** | Damped vibrations logarithmic decrement |
| **6** | Forced vibration |
| **7** | Forced vibration problems |
| **8** | Mid-Term Exam |
| **9** | Vibration isolation |
| **10** | Two degrees of freedom system |
| **11** | Dynamic vibration absorber |
| **12** | Multi-degree of freedom system |
| **13** | Torsional vibration |
| **14** | Continous systems |
| **15** | Continous systems |
| **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,….) | 2 | 3 | 6 |
| 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 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 30 | 30 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 30 | 30 |
|  | **Total workload** | | **112** |
|  | **Total workload / 30** | | **3.7** |
|  | **Course ECTS Credit** | | **4** |

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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 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. | 4 |
| **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. | 4 |
| **6** | Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence. | 4 |
| **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. |  |
| **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. |  |
| **12** |  |  |

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| **LECTUTER(S)** | | | | |
| **Prepared by** | Assoc. Prof. M. Alper Sofuoğlu |  |  |  |
| **Signature(s)** |  |  |  |  |

**Date:**06.06.2024