**ESOGU AERONAUTICAL ENGINEERING DEPARTMENT**

**COURSE INFORMATION FORM**

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| **Course Name** | **Course Code** |
| Linear Algebra | **152413006** |

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| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| 3 | 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** | To be able to use matrices and vectors, to apply basic methods to solve linear systems, to make matrix and vector operations in n-dimensional space, to be able to make eigen-decomposition. |
| **Short Course Content** | Linear equations and matrices, solving linear systems, vector spaces, inner product spaces, linear transformations, determinants, eigenvalues and eigenvectors |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| 1) | Students can find the solution of linear equation and system. | 1, 2 | 1, 11 | A |
| 2) | Students can use matrices and vectors in confidence. | 2, 3 | 1, 11 | A |
| 3) | Students can easily find a vector sets spanning different real vector spaces. | 2, 3 | 1, 11 | A |
| 4) | SStudents can make eigen-decomposition on matrix. | 3, 4 | 1, 11 | A |
| **5** |  |  |  |  |
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| **Main Textbook** | B. Kolman, D. R. Hill, *Elementary Linear Algebra*, Prentice Hall, 8th edition, 2004 |
| **Supporting References** | D. C Lay, *Linear Algebra and Its Applications*, Addison Wesley Longman, Inc., 2n edition 1997.  D. Poole, *Linear Algebra - a Modern Introduction*, Thomson Brooks/Cole, 2006 |
| **Necessary Course Material** | - |

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| **Course Schedule** | |
| **1** | Linear systems and matrices |
| **2** | Solving linear systems |
| **3** | Special matrices and finding inverses |
| **4** | LU decomposition |
| **5** | Vector Spaces |
| **6** | Subspaces and linear independence |
| **7** | Span and linear independence |
| **8** | Midterm |
| **9** | Midterm |
| **10** | Homogeneous systems |
| **11** | Inner product spaces |
| **12** | Linear Transformations and transformation matrices |
| **13** | Determinants |
| **14** | Eigenvalues and eigenvectors |
| **15** | Final |
| **16,17** | Linear systems and matrices |

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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 | 60 |
| Quiz |  |
| Homework |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 40 |
| **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 | Adequate knowledge of mathematics, science and Aeronautical Engineering;  ability to practice theoretical and practical knowledge of these areas into modeling and solving complex problems of Aeronautical Engineering | 2 |
| 2 | Ability to identify complex engineering problems in Aeronautical Engineering and related fields, for this purpose having skills to formulate, select and apply appropriate methods. | 3 |
| 3 | Having skills to apply modern design methods to design a complex system, process, equipment or product that should work under realistic conditions and constraints and  satisfy specific requirements concerning the Aeronautical Engineering. |  |
| 4 | Having skills to develop, select and apply modern techniques and tools needed to analyze and solve complex applications in Aeronautical Engineering, skills to use  information technology effectively. |  |
| 5 | Skills to design and conduct tests, collect data, analyze results, and interpret data for the  experimental investigation of complex problems in Aeronautical Engineering |  |
| 6 | Ability to function effectively as an individual and as a member of teams within the  discipline and in multidiscipline areas. | 2 |
| 7 | Communicating effectively in oral and written form both in Turkish and English. Effective report writing and understanding written reports, preparing design and manufacturing reports, making effective presentations, skills to give and receive clear and concise instructions. |  |
| 8 | Awareness of the necessity of lifelong learning, access to information, monitoring  developments in science and technology and the ability to self-renewing | 2 |
| 9 | Understanding of professional and ethical responsibility |  |
| 10 | Information on project management, change management and risk management practices, awareness on entrepreneurship and innovation, knowledge on sustainable development. |  |
| 11 | Information about universal and societal effects of engineering applications on health,  safety and environment; awareness of the legal consequences of engineering solutions. |  |
| **12** |  |  |

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| **LECTUTER(S)** | | | | |
| **Prepared by** |  |  |  |  |
| **Signature(s)** |  |  |  |  |

**Date:**06.06.2024