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| antalya bilim Ã¼niversitesi ile ilgili gÃ¶rsel sonucu | **ECTS Course Description Form** |
| **PART I ( Senate Approval)** |
| **Offering School**  | **College of Engineering** |
| **Offering Department** | **Industrial Engineering** |
| **Program(s) Offered to** | **Industrial Engineering**  | **Computer Engineering**  |
| **Civil Engineering**  | **Mechanical Engineering** |
| **Material Science and Nanotechonology Engineering** | **Electrical and Electronics Engineering** |
| **Course Code**  | **Math-201** |
| **Course Name** | **Linear Algebra** |
| **Language of Instruction** | **English** |
| **Type of Course** | **Compulsory** |
| **Level of Course** | **Undergraduate** |
| **Hours per Week** | **Lecture: 4** | **Laboratory:** | **Recitation: 2** | **Practical:**  | **Studio:** | **Other:** |
| **ECTS Credit** | **5** |
| **Grading Mode** | **Letter Grade** |
| **Pre-requisites** | **-** |
| **Co-requisites** | **-** |
| **Registration Restriction** | *-* |
| **Educational Objective** | The objectives of this course are to develop an intuitive understanding of the key ideas of linear algebra, and develop an ability to do linear algebra calculations. |
| **Course Description** | Basic concepts of linear algebra. Solutions of systems of linear equations; vectors and matrices; subspaces, linear independence, and bases; determinants; eigenvalues and eigenvectors; other topics and applications as time permits. |
| **Learning Outcomes** | **LO1** | Upon successful completion of the course, students will be able to have a good understanding of the following topics and their applications:o Systems of linear equationso Row reduction and echelon formso Matrix operations, including inverseso Block matriceso Linear dependence and independenceo Subspaces and bases and dimensionso Orthogonal bases and orthogonal projectionso Gram-Schmidt processo Linear models and least-squares problemso Determinants and their propertieso Cramer's Ruleo Eigenvalues and eigenvectorso Diagonalization of a matrixo Symmetric matriceso Positive definite matriceso Similar matriceso Linear transformations |
| **LO2** |
| **LO3** |
| **LO4** |
| **LO5** |
| **LO6** |
| **n..** |
| **PART II ( Faculty Board Approval)** |
| **Basic Outcomes (University-wide)** | **No.** | **Program Outcomes** | **LO1** | **LO2** | **LO3** | **LO4** | **LO5** | **LO6** |
| **PO1** | **Ability** to communicate effectively and write and present a report in Turkish and English.  | 🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸🗸   🗸🗸🗸🗸  🗸🗸🗸🗸 |
| **PO2** | **Ability** to work individually, and in intra-disciplinary and multi-disciplinary teams. |
| **PO3** | **Recognition** of the need for life-long learning and **ability** to access information , follow developments in science and technology, and continually reinvent oneself. |
| **PO4** | **Knowledge** of project management, risk management, innovation and change management, entrepreneurship, and sustainable development. |
| **PO5** | **Awareness** of sectors and **ability** to prepare a business plan. |
| **PO6** | **Understanding** of professional and ethical responsibility and **demonstrating** ethical behavior. |
| **Faculty Specific Outcomes** | **PO7** | Ability to develop, select and use modern techniques and tools necessary for engineering applications and ability to use information technologies effectively. |
| **PO8** | Recognition of the effects of engineering applications on health, environment and safety in the universal and societal dimensions and the problems of the time and awareness of the legal consequences of engineering solutions. |
| **PO9** | Ability to identify, define, formulate and solve complex engineering problems; and electing and applying appropriate analysis and modeling methods for this purpose. |
| **Discipline Specific Outcomes (program)** | **PO10** | Sufficient knowledge in mathematics, science and engineering and the ability to apply theoretical and practical knowledge in these areas to model and solve engineering problems. |
| **PO11** | Ability to design a complex system, process, device or product to meet specific requirements under realistic constraints and conditions of economic, environmental, sustainability, manufacturability, ethics, health, safety, social and political issues; and the ability to apply modern design methods for this purpose.  |
| **PO12** | Ability to design experiments, conduct experiments, collect data, analyze and interpret results for the examination of engineering problems. |
| **Specialization Specific Outcomes** | **PO N….** |  |
| **PART III ( Department Board Approval)** |
| **Course Subjects, Contribution of Course Subjects to Learning Outcomes, and Methods for Assessing Learning of Course Subjects** | **Subjects** | **Week** |  | **LO1** | **LO2** | **LO3** | **LO4** | **LO5** | **LO6** |
| **S1** | 1 | Systems of Linear Equations; Matrices | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* |  |
| **S2** | 2 | Row Reduction and Echelon Forms; Vector Equations;The Matrix Equation Ax = b | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* |  |
| **S3** | 3 | Solution Sets of Linear Systems; Linear Independence | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* |  |
| **S4** | 4 | Introduction to Linear Transformations; | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* |  |
| **S5** | 5 | Matrix Operations. | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* |  |
| **S6** | 6 | The Inverse of a Matrix; Characterizations of Invertible Matrices | *D1-D2-D3*  | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* |  |
| **S7** | 7 | Subspaces of R^n; | *D1-D2-D3* | *D1-D2-D3*  | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* |  |
| **S8** | 8 | **Midterm Exam** | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* |  |
| **S9** | 9 | Dimension and Rank; Introduction to Determinants; | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* |  |
| **S10** | 10 | Properties of Determinants; Cramer's Rule, Volume, and Linear Transformations;. | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* |  |
| **S11** | 11 | Eigenvectors and Eigenvalues; The Characteristic Equation.. | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* |  |
| **S12** | 12 | Diagonalization; Complex Eigenvalues; Inner Product, Length, and Orthogonality | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* |  |
| **S13** | 13 | Orthogonal Sets; Orthogonal Projections. | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* |  |
| **S14** | 14 | The Gram-Schmidt Process; Diagonalization of Symmetric Matrices | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* | *D1-D2-D3* |  |
| **Assessment Methods, Weight in Course Grade, Implementation and Make-Up Rules**  | **No.** | **Type** | **Weight** | **Implementation Rule** | **Make-Up Rule** |
| **A1** | **Exam** | 70 | No electronic devices are allowed in the examinations. | If the reason for not taking the exam is justified by the school, the student is informed about the time of the make-up exam. |
| **A2** | **Quiz** | 25 | It is given at any time without informing to the students*.* | The compensation of he quizzes is valid in case of special situations. |
| **A3** | **Homework** | 5 | Homeworks are given by announcing deadline. Homeworks that are submitted after the deadline are not accepted. | There is no compensation for the homeworks. |
| **A4** | **Project** |  |  |  |
| **A5** | **Report** |  | - | - |
| **A6** | **Presentation** |  | - | - |
| **A7** | **Attendance/ Interaction** |  | - | - |
| **A8** | **Class/Lab./****Field Work** |  | - | - |
| **A9** | **Other** |  |  |  |
| **TOTAL** | **100%** |
| **Evidence of Achievement of Learning Outcomes** | Letter grades determined by weighting on the specified percentages on the grades that are taken from exams, quizzes and homeworks by the students.The teaching staff can make changes in the student's grades. |
| **Method for Determining Letter Grade** |

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| **Activities** | Midterm Exams | Quizzes | Homeworks | Final Exam |
| **Quantity** | 1 | 10 | 2 | 1 |
| **Effects on Grading, %)** | 30 | 25 | 5 | 40 |

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| **Teaching Methods, Student Work Load** | **No** | **Method** | **Explanation** | **Hours** |
| ***Time applied by instructor*** |
| **1** | **Lecture** |  | 4x14 |
| **2** | **Interactive Lecture** |  |  |
| **3** | **Recitation** |  | 2x14 |
| **4** | **Laboratory** |  |  |
| **5** | **Practical** |  |  |
| **6** | **Field Work** |  |  |
| ***Time expected to be allocated by student*** |
| **7** | **Project** |  |  |
| **8** | **Homework** |  | 15 |
| **9** | **Pre-class Learning of Course Material**  |  | 56 |
| **10** | **Review of Course Material** |  | 70 |
| **11** | **Studio** |  |  |
| **12** | **Office Hour** |  |  |
| **TOTAL** |  |
| **IV. PART** |
| **Instructor** | **Name** | Hakan Şimşek |
| **E-mail** | hakan.simsek@antalya.edu.tr |
| **Phone Number** | 0544 445 07 67  |
| **Office Number** | A1-26 |
| **Office Hours** | It will be determined during the semester. |
| **Course Materials** | **Mandatory** |  |
| **Recommended** | * Linear Algebra and its Applications, Lay, Addison Wesley ISBN 0-321-28713-4.
 |
| **Other** | **Scholastic Honesty** | Violations of scholastic honesty include, but are not limited to cheating, plagiarizing, fabricating information or citations, facilitating acts of dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students. Any for of scholastic dishonesty is a serious academic violation and will result in a disciplinary action. |
| **Students with Disabilities** | Reasonable accommodations will be made for students with verifiable disabilities. |
| **Safety Issues**  | The course does not require any special safety precautions. |
| **Flexibility** | Circumstances may arise during the course that prevents the instructor from fulfilling each and every component of this syllabus; therefore, the syllabus is subject to change.  Students will be notified prior to any changes.  |