**SEMESTER 1**

| **Department**<br>Department of Statistics | | | **Date** | | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>İST1101 | **Course Unit Title**<br>Introduction To Probability And Statistics-I | | **Semester/Year**<br>Fall / 1 | **Number of ECTS Credits**<br>3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | The course will be held 3 hours a week with face-to-face methods. | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

| **Course content** | To enable students to learn the basic concepts, methods and applications of statistical science. This course aims to develop students' skills in collecting, organizing, analyzing and interpreting data. By learning descriptive and inferential statistical methods, students will learn to effectively use basic statistical tools that can be used in data analysis. |
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| **Weekly Detailed Course Contents** | |
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| **Week** | **Topic** |
| **1** | Basic Concepts |
| **2** | Arithmetic Mean |
| **3** | Weighted Mean |
| **4** | Geometric Mean |
| **5** | Squared Mean |
| **6** | Harmonic Mean |
| **7** | Non-sensitive averages: Mode, Median |
| **8** | Measures of Distribution, Range of Variation, Cartesians, Deciles, Santiles |
| **9** | Mean deviation, variance, standard deviation, coefficient of variation |
| **10** | Skewness |

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| **11** | Moments, kurtosis |
| **12** | Correlation |
| **13** | Relationship Measures: Spearman Rho, Kendall Tau |
| **14** | Spread diagram, graphical representation of linear relationships, regression definition |

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| **Course Resources** | Introduction to the Practice of Statistics - David S. Moore, George P. McCabe, Bruce A. Craig<br>Statistics for Business and Economics - Paul Newbold, William L. Carlson, Betty Thorne |

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| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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| **Course Outcome** | |
| **Aims of the course** | |
| **The way of processing course** | Face to face |

| Relation of the course with program outcomes | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | X |
| **2** | Indicates the place and importance of statistics in professional life. | | | X |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | X |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| **Department**<br>Department of Statistics | | | **Date** |
|---|---|---|---|
| **Course Unit Code**<br>İST1111 | **Course Unit Title**<br>Data Science | **Semester/Year**<br>Fall / 1 | **Number of ECTS Credits**<br>3 |
| **Language of Instruction** | Turkish | | |
| **Type of Course Unit** | Compulsory | | |
| **Prerequisites and co-requisites** | The course will be held 3 hours a week with face-to-face methods. | | |
| **Address of course** | - | | |

| Local Credit | Theoretical | Practical | Laboratory | Presentation | Project |
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| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | To develop students' ability to analyze, interpret and draw meaningful conclusions from large data sets. This course aims to enable students to manage data science projects from start to finish by providing knowledge in data collection, cleaning, visualization, modeling and reporting results. Students will gain practical experience using a variety of data science tools and techniques and develop their ability to solve real-world problems. |

| **Weekly Detailed Course Contents** | |
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| **Week** | **Topic** |
| **1** | Mass, sample, unit and variable concepts |
| **2** | Parameter, statistics concept |
| **3** | What is sampling? Explanation of sampling methods |
| **4** | Random numbers, simple random sampling |
| **5** | Random numbers, stratified sampling |
| **6** | Random numbers, probability sampling |
| **7** | Random numbers, non-probability sampling |
| **8** | Variables, measurement levels |
| **9** | Data collection tools |
| **10** | Data organization, processing, graphical representations |
| **11** | Numerical representation of data |
| **12** | Excel and SPSS application |
| **13** | Excel and SPSS application Excel and SPSS application |
| **14** | Excel and SPSS application |

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| **Course Resources** | Data Science from Scratch - Joel Grus<br>Introduction to Statistical Learning - Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani |

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| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |

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| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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| **Course Outcome** | |
| **Aims of the course** | |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | X | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | X | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |

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|---|---|---|---|---|
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

| **Department** | | | **Date** | | |
|---|---|---|---|---|---|
| Department of Statistics | | | | | |
| **Course Unit Code** | **Course Unit Title** | | **Semester/Year** | **Number of ECTS Credits** | |
| YMH1113 | Algorithm and Programming-I | | Fall / 1 | 3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | The course will be held 3 hours a week with face-to-face methods. | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | What are algorithms, how to set them up. What are the steps of systematic problem solving and how to do it? Introduction of flow diagram elements and development of algorithmic thinking structure with these elements. Sample problem solutions and the concept of looping in problem solving, the use of condition/condition statements. Introduction to Java programming language, variables, data types in Java, compiling the first program. Identifiers, operators, variable definition, constants in Java. Increment/decrement operators, comparison operators, decision structures (if, if-else, nested if-else, switch structure, conditional statement structure) in Java. Mathematical functions in Java, char data type, Unicode, ASCII, String type, print method. Loops in Java, while, do-while, for loops, break and continue concepts. Arrays in Java, single and multidimensional arrays, array operations, for each loop. Methods in Java, method definition, arguments. |

| Weekly Detailed Course Contents | |
|---|---|
| **Week** | **Topic** |
| **1** | Understanding algorithms |
| **2** | What is an algorithm? Systematic problem solving |
| **3** | Flow diagrams |
| **4** | Problem solving, loop concept |
| **5** | Problem solving, condition/condition statements |
| **6** | Problem solving |
| **7** | Introduction to Java programming language |
| **8** | Variables in Java, data types, initial program compilation |
| **9** | Identifiers, operators, variable definition, constants in Java |
| **10** | Increment/decrement operators, comparison operators in Java, decision structures (if, if-else, nested if-else, switch |
| **11** | Mathematical functions in Java, char data type, Unicode, ASCII, String type, printf |
| **12** | Loops in Java, while, do-while, for loops, break and continue concepts |
| **13** | Arrays in Java, single and multi-dimensional arrays, array operations, foreach loop |
| **14** | Methods in Java, method definition, arguments |

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| **Course Resources** | Y. Daniel Liang (2009), Introduction to JAVA Programming Comprehensive Version 10th Edition, Pearson |

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| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |

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| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | |
| **Aims of the course** | |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| | Learning outcomes | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | X |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | X |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |

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|---|---|---|---|---|
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

| **Department** | | **Academic Year** | | **Date** | |
|---|---|---|---|---|---|
| Department of Statistics | | | | | |
| **Course Unit Code** | **Course Unit Title** | **Semester/Year** | | **Number of ECTS Credits** | |
| MAT1131 | Linear Algebra-I | Fall / 1 | | 6 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 4 | 4 | 0 | - | - | - |
| **Name of Lecturers** | Prof. Dr. Muhittin Evren AYDIN | | | | |
| **Assistants** | - | | | | |

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| **Course content** | Definition of a matrix, matrix addition and scalar multiplication operations, matrix multiplication operation, elementary operations. Definition and calculation of the determinant, methods of determinant calculation. Calculation of the inverse of a matrix with respect to multiplication. The rank of a matrix. Definition of a system of linear equations, existence, non-existence, and uniqueness of solutions. Cramer's rule, Gauss-Jordan methods.<br>Homogeneous systems of equations. Definition of algebraic structures and binary operations. Group and subgroup definitions and some basic properties, examples of groups. Definition of a ring and some basic properties, examples of rings. Definition of a field and some basic properties, examples of fields. Definition of a vector space and some basic properties. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Matrix definition, matrix addition and scalar multiplication operations. Examples related to these. |
| **2** | Matrix multiplication operation and related examples. |
| **3** | Types of matrices: square matrices, diagonal matrices, identity matrix. The transpose of a matrix. Examples related to these. |
| **4** | Elementary operations, definition and calculation of the determinant. Examples related to these. |
| **5** | Methods of determinant calculation and related examples. |

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| **6** | Calculation of the inverse of a matrix with respect to multiplication and related examples. |
| **7** | Symmetric and antisymmetric matrices. Orthogonal matrices. Examples related to these. |
| **8** | The rank of a matrix, definition of a system of linear equations, existence, non-existence, and uniqueness of solutions. Examples related to these. |
| **9** | Applications. |
| **10** | Cramer's rule, Gauss-Jordan methods, homogeneous systems of equations. Examples related to these. |
| **11** | Group definitions and some basic properties, examples of groups. |
| **12** | Definition of a ring and some basic properties, examples of rings. |
| **13** | Definition of a field and some basic properties, examples of fields. |
| **14** | Applications. |

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| **Course Resources** | 1. Lineer Cebir, Arif SABUNCUOĞLU<br>2. Lineer Cebir, Hasan Hilmi HACISALİHOĞLU |

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| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social sciences** | 0 |

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| **Course Outcome** | The goal is to provide students with fundamental knowledge on vectors, matrices, and determinants, and to support theoretical concepts with practical applications, enabling them to develop the ability to solve systems of linear equations. |
| **Aims of the course** | The aim is to provide students with the necessary foundational knowledge for the Linear Algebra course. The goal is to equip them with the technical expertise to generate the most suitable solutions for problems related to Linear Algebra that require resolution. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | X |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| **Department** | | **Academic Year** | **Date** |
|---|---|---|---|
| Department of Statistics | | | |
| **Course Unit Code** | **Course Unit Title** | **Semester/Year** | **Number of ECTS Credits** |

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|---|---|---|---|---|---|
| MATH1133 | Mathematics I | | Fall / 1 | 6 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 5 | 4 | 2 | - | - | - |
| **Name of Lecturers** | Professor Handan ÖZTEKİN | | | | |
| **Assistants** | - | | | | |

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| **Course content** | Numbers, Sets, Absolute Value, Inequalities and Equations, Functions, Trigonometric Functions and Inverse of them, Exponential and Logarithmic Functions, Sequences and Their Limits, Series and Tests of Convergence, Power Series, Limits of Functions , Continuity of a Function, Differentiation and Differentiation Rules, Logarithms and Exponential Functions and Their Derivatives, Logarithmic Differentiation, Inverse Trigonometric Functions and Their Derivatives, Hyperbolic Functions and Their Derivatives, Inverse Hyperbolic Functions and Their Derivatives, Applications of Derivative, Indeterminate Limits and L'Hospital Rules, Taylor and Maclaurin Series. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Numbers, Sets, Absolute Value, Inequalities and Equations |
| **2** | Functions and Types of Functions |
| **3** | Exponential and Logarithmic Functions |
| **4** | Trigonometric Functions |
| **5** | Sequences and Their Limits |
| **6** | Introduction to Series, Series of Partial Sums and Convergence |
| **7** | Positive Term Series and Tests of Convergence, Power Series |
| **8** | Limits of Functions and Rules of Limit, Continuity of a Function |
| **9** | Differentiation and Differentiation Rules |
| **10** | High Order Derivetive and Chain Rule |
| **11** | Logarithmic Differentiation, Derivative of Inverse Function and Closed Function |
| **12** | Derivatives of Exponential, Logarithmic, Hyperbolic, Trigonometric Functions |
| **13** | Indeterminate Limits and L'Hospital Rules, Taylor and Maclaurin Series |
| **14** | General Practice Course |

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| **Course Resources** | 1. Mathematical Analysis I (Mustafa Balcı)<br>2. Calculus I (Ahmet Dernek)<br>3. Solving Mathematical Analysis I ( Mustafa Balcı) |

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| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social sciences** | 0 |

| | |
|---|---|
| **Course Outcome** | Students have basic information about real number, sequence, function subjects and understand limit, continuity and derivative concepts theoretically. |
| **Aims of the course** | 1. To create the necessary infrastructure of the students in regard to the Calculus lesson.<br>2. Acquiring the technical knowledge that will be able to produce the most suitable solution to the students in problems that are related to mathematics lesson and require solution. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |

| | | | | |
|---|---|---|---|---|
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | X |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | **Contribution of the course**: 1:No 2:Partially 3:Completely | |

**SEMESTER 2**

| **Department**<br>Department of Statistics | | | **Date** | | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>İST1102 | **Course Unit Title**<br>Introduction To Probability And Statistics-II | | **Semester/Year**<br>Fall / 1 | **Number of ECTS Credits**<br>3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | The course will be held 3 hours a week with face-to-face methods. | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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|---|---|
| **Course content** | To develop students' skills in collecting, analyzing, interpreting and presenting data. This course aims to strengthen students' ability to conduct research and make data-driven decisions by providing knowledge of basic statistical concepts, techniques and applications. Students will learn both descriptive and inferential statistical methods and will be able to apply these methods to various data sets. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Universe and parameter concept |
| **2** | Sample and statistics concept |
| **3** | Selection of different samples representing the universe and calculation of sample statistics |
| **4** | Sampling distribution |
| **5** | Central limit theorem, distribution of sample mean |
| **6** | Point estimate, interval estimate, confidence interval for the mean |
| **7** | Confidence interval for the mean |
| **8** | Confidence interval for the ratio |
| **9** | Confidence interval for the variance |
| **10** | Confidence interval for the difference of two means |
| **11** | Confidence interval for the difference of two ratios |
| **12** | Confidence interval for the difference of two variances |
| **13** | Tests of goodness of fit |
| **14** | Homogeneity of variances |

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|---|---|
| **Course Resources** | Ünver, Ö., Gamgam, H., Altunkaynak, B. (2016) SPSS Uygulamalı Temel İstatistik Yöntemler, Seçkin Yayınları<br>Spiegel, M. (2000), Schaum's Outlines: İstatistik, Nobel Kitabevi.<br>Moore, D.S., McCabe, G.P., Craig, B.A., Introduction to Practice of Statistics, 2009, W. H. Freeman and Company,<br>9781429216227 |

| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
|---|---|---|---|
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |

| | | | |
|---|---|---|---|
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | |
| **Aims of the course** | |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| | Learning outcomes | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | X |
| **2** | Indicates the place and importance of statistics in professional life. | | | X |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | X |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |

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|---|---|---|---|---|
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

| **Department** | | | **Date** | | |
|---|---|---|---|---|---|
| Department of Statistics | | | | | |
| **Course Unit Code** | **Course Unit Title** | | **Semester/Year** | **Number of ECTS Credits** | |
| İST1112 | Critical And Analytical Thinking | | Fall / 1 | 3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | The course will be held 3 hours a week with face-to-face methods. | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | The general aim of this course is to understand the importance of thinking and thinking skills, basic thinking skills, and to apply critical and analytical thinking skills in daily and professional life. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Basic concepts and definitions |
| **2** | Brain as a thinking organ |

| | |
|---|---|
| **3** | Ways of thinking and grouping of thinking |
| **4** | Involuntary thinking and its characteristics |
| **5** | Voluntary thinking and its characteristics |
| **6** | Methods of voluntary thinking |
| **7** | Critical and analytical thinking |
| **8** | Stages of critical and analytical thinking |
| **9** | Factors affecting critical and analytical thinking |
| **10** | Scope of critical and analytical thinking |
| **11** | Critical and analytical reading |
| **12** | Critical andanalytical listening |
| **13** | Critical and analytical writing |
| **14** | Self-assessment of critical and analytical thinking process |

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| **Course Resources** | İpşiroğlu, Z. (2002). Düşünmeyi Öğrenme ve Öğretme, İstanbul: Alfa Yayınları.<br>Nosich, M. G. (2015). Eleştirel düşünme ve disiplinler arası eleştirel düşünme rehberi (çev. B. Aybek ). Ankara: Anı Yayıncılık. |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. | | |

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|---|---|
| | In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

| | |
|---|---|
| **Course Outcome** | |
| **Aims of the course** | |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | X |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| Department<br>Department of Statistics | | | | Date | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>YMH1114 | **Course Unit Title**<br>Algorithm and Programming-II | | **Semester/Year**<br>Fall / 1 | **Number of ECTS Credits**<br>3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | The course will be held 3 hours a week with face-to-face methods. | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

| **Course content** | Introduction to object oriented programming in Java, using methods. Objects and classes, data space encapsulation, object arrays, immutable object and class concepts and definition. Object oriented thinking, class abstraction and encapsulation concepts, package, public, default, private concepts. Inheritance, superclasses and subclasses. Polymorphism, method overriding and overloading. Exception handling. File class and file input/output operations (File class, PrintWriter and Scanner). Abstract classes. Interfaces (interfaces). Class design guidelines. Graphical user interface (GUI) |
|---|---|

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction to object oriented programming with Java |
| **2** | Using methods in Java |
| **3** | Objects and classes |
| **4** | Objects and classes, data field encapsulation, object arrays, immutable objects and classes |
| **5** | Object oriented thinking, class abstraction and encapsulation concepts |
| **6** | Object oriented thinking, package, public, default, private concepts |
| **7** | Inheritance, superclasses and subclasses |
| **8** | Polymorphism, method overriding and overloading |
| **9** | Exception handling |
| **10** | File class and file input/output operations File class, PrintWriter and Scanner |

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|---|---|
| **11** | Abstract classes |
| **12** | Interfaces |
| **13** | Class design guidelines |
| **14** | Graphical user interface (GUI) |

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| **Course Resources** | Y. Daniel Liang (2009), Introduction to JAVA Programming Comprehensive Version 10th Edition, Pearson |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

| | |
|---|---|
| **Course Outcome** | |
| **Aims of the course** | |

| | |
|---|---|
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | X |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | X |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| **Department** | | **Academic Year** | **Date** |
|---|---|---|---|
| Department of Statistics | | | |
| **Course Unit Code** | **Course Unit Title** | **Semester/Year** | **Number of ECTS Credits** |
| MAT1132 | Linear Algebra-II | Spring / 1 | 6 |
| **Language of Instruction** | Turkish | | |
| **Type of Course Unit** | Compulsory | | |

| | | | | | |
|---|---|---|---|---|---|
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 4 | 4 | 0 | - | - | - |
| **Name of Lecturers** | Prof. Dr. Muhittin Evren AYDIN | | | | |
| **Assistants** | - | | | | |

| | |
|---|---|
| **Course content** | Definition of vector space and some basic properties, subspaces, linear combination and the concept of being spanned by vectors, linearly dependent and independent vectors, the concept of a basis, operations between vectors and their applications, scalar product and cross product, the concept of Gram-Schmidt orthonormalization, linear transformations between vector spaces, matrices corresponding to linear transformations, rank and kernel space of a transformation, eigenvalue and eigenvector concepts, the Cayley-Hamilton Theorem and applications, factorization of matrices. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Definition of a vector space and some basic properties, examples of vector spaces. |
| **2** | Subspaces, linear combination, and the concept of being spanned by vectors. Examples related to these. |
| **3** | Linearly dependent and independent vectors. Examples related to these. |
| **4** | The concept of a basis, operations between vectors and their applications. Examples related to these. |
| **5** | Scalar product and cross product. Examples related to these. |
| **6** | Concept of Gram-Schmidt orthonormalization. Examples related to these. |
| **7** | Linear transformations between vector spaces. Examples related to these. |
| **8** | Applications. |
| **9** | Matrices corresponding to linear transformations. Examples related to these. |
| **10** | The rank of a transformation, the kernel space. Examples related to these. |
| **11** | Eigenvalue and eigenvector concepts. Examples related to these. |
| **12** | Cayley-Hamilton Theorem and its applications. Examples related to these. |
| **13** | Factorization of matrices. Examples related to these. |
| **14** | Applications. |

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|---|---|
| **Course Resources** | 3. Lineer Cebir, Arif SABUNCUOĞLU<br>4. Lineer Cebir, Hasan Hilmi HACISALİHOĞLU |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |

| | | | |
|---|---|---|---|
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social sciences** | 0 |

| | |
|---|---|
| **Course Outcome** | To provide students with fundamental knowledge on vectors, vector spaces, and linear transformations, and to support theoretical concepts with practical applications, enabling them to develop the ability to calculate eigenvalues and eigenvectors. |
| **Aims of the course** | The aim is to provide students with the necessary foundational knowledge for the Linear Algebra course. The goal is to equip them with the technical expertise to generate the most suitable solutions for problems related to Linear Algebra that require resolution. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |

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|---|---|---|---|---|
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | X |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

| **Department** | | | **Academic Year** | **Date** | |
|---|---|---|---|---|---|
| Department of Statistics | | | | | |
| **Course Unit Code** | **Course Unit Title** | | **Semester/Year** | **Number of ECTS Credits** | |
| MATH1134 | Mathematics II | | Spring / 1 | 6 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 5 | 4 | 2 | - | - | - |
| **Name of Lecturers** | Professor Handan ÖZTEKİN | | | | |
| **Assistants** | - | | | | |

| | |
|---|---|
| **Course content** | Derivative and its Applications, Indefinite Integrals, Methods of Integration, Definite (Riemann) Integral, Applications of Definite Integral (limits, area, volumes, the area of a Surface of Revolution, account of length of a curve), Improper Integrals (First, Second and Third Type), Definition and Image set of Multi-Variable Functions, Partial Derivations, Chain Rule, Total Differential, Derivation of Implicit Functions and Related Problems, Differentiation under Integral Sign (Leibtniz), Double Integrals, Regional Transformations and Related Problems. |

## Weekly Detailed Course Contents

| Week | Topic |
|---|---|
| **1** | Derivative and its geometric meaning |
| **2** | Local Extremum Points |
| **3** | Maximum and Minimum Points |
| **4** | Indefinite Integrals |
| **5** | Methods of Integration |
| **6** | Definite (Riemann) Integral |
| **7** | Applications of Definite Integral |
| **8** | Improper Integrals (First, Second and Third Type) |
| **9** | Definition and Image set of Multi-Variable Functions |
| **10** | Partial Derivations, Chain Rule |
| **11** | Differentiation under Integral Sign |
| **12** | Double Integrals |
| **13** | Regional Transformations for Double Integrals and Related Problems. |
| **14** | General Practice Course |

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| **Course Resources** | 1. Mathematical Analysis I (Mustafa Balcı)<br>2. Calculus I (Ahmet Dernek)<br>3. Solving Mathematical Analysis I ( Mustafa Balcı) |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. | | |

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|---|---|
| | In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social sciences** | 0 |

| | |
|---|---|
| **Course Outcome** | Students have basic information about indefinite and definite integral, series and support these concepts with applications. Students have basic information about partial derivation, chain rule, maximum and minimum problems, of two-variable functions, double integrals and applications. |
| **Aims of the course** | 1. To create the necessary infrastructure of the students in regard to the matematics lesson.<br>2. Acquiring the technical knowledge that will be able to produce the most suitable solution to the students in problems that are related to mathematics lesson and require solution. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | X |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

**SEMESTER 3**

| **Department**<br>Department of Statistics | | | **Date** | | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>İST 2101 | **Course Unit Title**<br>Sampling | | **Semester/Year**<br>Fall / 1 | **Number of ECTS Credits**<br>3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | The course will be held 3 hours a week with face-to-face methods. | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

| **Course content** | Students will be able to conduct field studies, create a sampling plan, select and analyze the sample with the appropriate sampling technique, test the research hypothesis by establishing appropriate hypotheses. |
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| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Basic concepts, sampling techniques. |
| **2** | Sampling method appropriate to the mass structure, determining sample size and sampling units |
| **3** | Data types, data sources, data collection techniques. |
| **4** | Frequency distributions Measures |
| **5** | of central tendency Measures of |
| **6** | dispersion, skewness, kurtosis |
| **7** | Probability and Special Probability Distributions, Sampling Distributions |
| **8** | Sampling Distributions |
| **9** | Estimation of Parameters |
| **10** | Interval Estimation, Bootstrap Confidence Intervals |
| **11** | Hypothesis Testing |

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|---|---|
| **12** | Logic of Sample Selection |
| **13** | Inferential Statistics: Parametric Tests I-II and Nonparametric Tests |
| **14** | Research Design and Statistical Test Selection |

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| **Course Resources** | Örnekleme Yöntemleri ve Hipotez Testleri" Özer Serper, Mustafa AYTAÇ, Nuran BAYRAM. |

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| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

| | |
|---|---|
| **Course Outcome** | |
| **Aims of the course** | |
| **The way of processing course** | Face to face |

| Relation of the course with program outcomes | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | X |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | X |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| **Department**<br>Department of Statistics | | | | **Date** | |
|---|---|---|---|---|---|
| **Course Unit Code:**<br>**IST2103** | **Course Unit Title**<br>Hypothesis Testing | | **Semester/Year**<br>Fall / 2 | **Number of ECTS Credits**<br>6 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |

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|---|---|---|---|---|---|
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | This course aims to teach students the fundamental principles and applications of hypothesis testing, enhancing their ability to make statistical inferences. Students will gain proficiency in correctly formulating hypotheses, selecting appropriate statistical tests, and accurately interpreting the results. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction to Hypothesis Testing |
| **2** | One-Sample T-Test |
| **3** | Independent Two-Sample T-Test |
| **4** | Paired Two-Sample T-Test |
| **5** | One-Tailed and Two-Tailed Tests |
| **6** | ANOVA Analysis - I |
| **7** | ANOVA Analysis - II |
| **8** | Chi-Square Test |
| **9** | Correlation and Regression Analysis - I |
| **10** | Correlation and Regression Analysis - II |
| **11** | Nonparametric Hypothesis Tests - I |
| **12** | Nonparametric Hypothesis Tests - II |
| **13** | Applications and Project |
| **14** | Applications and Project |

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| **Course Resources** | • "Introductory Statistics" by Neil A. Weiss<br>• "Introduction to the Practice of Statistics" by David S. Moore, George P. McCabe, and Bruce A. Craig |

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| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |

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|---|---|---|---|
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | 1. Understanding the definition and significance of hypothesis testing.<br>2. Selecting and applying appropriate hypothesis tests for different data structures.<br>3. Interpreting hypothesis test results correctly and drawing meaningful conclusions.<br>4. Gaining practical experience in applying hypothesis tests to real-world datasets. |
| **Aims of the course** | The aim of this course is to teach students the fundamental principles and applications of hypothesis testing, enhancing their ability to make statistical inferences. Students will gain proficiency in correctly formulating hypotheses, selecting appropriate statistical tests, and accurately interpreting the results. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | X |
| **6** | Establishes and uses software architecture. | | | |

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|---|---|---|---|---|
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | X |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | **Contribution of the course**: 1:No 2:Partially 3:Completely | |

| **Department**<br>Department of Statistics | | | **Date** | |
|---|---|---|---|---|
| **Course Unit Code**<br>IST2105 | **Course Unit Title**<br>Mathematical Statistics I | **Semester/Year**<br>Fall / 2 | **Number of ECTS Credits**<br>6 | |
| **Language of Instruction** | Turkish | | | |
| **Type of Course Unit** | Compulsory | | | |
| **Prerequisites and co-requisites** | - | | | |
| **Address of course** | - | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | This course provides a mathematical foundation for statistical analysis, focusing on probability theory, random variables, probability distributions, and statistical estimation. Students will learn to model and analyze statistical problems using mathematical tools, gaining essential skills for advanced statistical applications. |

| Weekly Detailed Course Contents | |
|---|---|
| **Week** | **Topic** |
| **1** | Sigma Algebra, Borel Algebra, Probability Spaces |
| **2** | Conditional Probability in Distribution Functions, Bayes' Theorem |
| **3** | Random Variables, Distribution Functions and Their Properties |
| **4** | Multivariate Distributions and Their Properties |
| **5** | Multivariate Distributions and Their Properties (continued) |
| **6** | Expected Value and Variance in Distribution Functions |
| **7** | Generating Functions: Moment-Generating Function |
| **8** | Generating Functions: Characteristic Function, Probability Generating Function |
| **9** | Transformation Techniques |
| **10** | Transformation Techniques (continued) |
| **11** | Binomial, Geometric, and Negative Binomial Distributions |
| **12** | Poisson and Hypergeometric Distributions |
| **13** | Uniform, Exponential, and Normal Distributions |
| **14** | Bivariate Normal Distribution, Quadratic Forms |

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| **Course Resources** | Mathematical Statistics with Applications – Dennis Wackerly, William Mendenhall, Richard L. Scheaffer<br>Probability and Statistics for Engineering and the Sciences – Jay L. Devore |

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| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. | | |

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| | In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | 1-Understand fundamental concepts of probability theory and their mathematical foundations.<br>2-Identify and analyze different types of random variables and their probability distributions.<br>3-Apply probability rules and theorems, including Bayes' Theorem, in statistical inference.<br>4-Utilize mathematical tools to derive expectations, variances, and moment-generating functions.<br>5-Develop a strong foundation for advanced statistical methods and real-world applications. |
| **Aims of the course** | This course aims to teach students the fundamental mathematical principles and methods of statistics. The topics covered include probability theory, random variables, probability distributions, and statistical estimation. By completing this course, students will be able to model and solve statistical problems within a mathematical framework. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | X |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | X |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |

| **Contribution of the course**: 1:No 2:Partially 3:Completely |
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| **Department**<br><br>Department of Statistics | | | **Date** | | |
|---|---|---|---|---|---|
| **Course Unit Code**<br><br>IST2107 | **Course Unit Title**<br><br>Categorical Data Analysis with MAXQDA | | **Semester/Year**<br><br>Fall / 2 | **Number of ECTS Credits**<br><br>3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Elective | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

| **Course content** | This course focuses on categorical data analysis using the MAXQDA software. Students will learn how to import, organize, code, and analyze qualitative data systematically. The course covers essential topics such as thematic and content analysis, coding techniques, category relationships, and data visualization. Additionally, students will explore advanced features of MAXQDA, including text analysis tools and reporting methods. By the end of the course, students will be able to conduct structured qualitative research and present their findings effectively. |
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| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction to MAXQDA and its interface |
| **2** | Importing and managing data, overview of basic data analysis tools |
| **3** | Creating categories and coding |
| **4** | Coding principles and management |
| **5** | Establishing relationships between categories and creating tree structures |
| **6** | Analyzing relationships between coded data, working with coding trees |
| **7** | Thematic analysis and comparisons between categories |
| **8** | Data segmentation and grouping, interpretation, and extracting results |
| **9** | Advanced categorical analysis techniques (coding trees, morphological analysis, etc.) |
| **10** | Reporting and presenting categorical analysis results |

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| **11** | Analyzing textual data and coding text |
| **12** | Using MAXQDA's text analysis tools, interpreting and reporting text analysis results |
| **13** | Data exchange and collaboration between projects, overview of other MAXQDA tools |
| **14** | Course evaluation and recommendations for future studies |

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| **Course Resources** | Qualitative Data Analysis with MAXQDA – Udo Kuckartz, Stefan Rädiker<br>The Coding Manual for Qualitative Researchers – Johnny Saldana |

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| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 25 |
| | **Computer Sciences** | 25 |
| | **Programming Design** | 25 |
| | **Social Sciences** | 25 |

| | |
|---|---|
| **Course Outcome** | 1-Understand the installation process and basic interface usage of MAXQDA.<br>2-Import and organize various data types (text, audio, video, images) within MAXQDA.<br>3-Apply coding techniques to categorize and analyze qualitative data.<br>4-Conduct thematic analysis, content analysis, and other qualitative research methods.<br>5-Generate reports and effectively present qualitative analysis results. |
| **Aims of the course** | The aim of this course is to equip students with the necessary skills to effectively analyze categorical and qualitative data using MAXQDA software. Students will learn how to import, code, categorize, and interpret data systematically. Additionally, the course will |

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|---|---|
| | focus on applying thematic and content analysis techniques, enabling students to generate meaningful insights and present their findings in a structured manner. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | X |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | X |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| **Department**<br>Department of Statistics | | | **Date** |
|---|---|---|---|
| **Course Unit Code**<br>IST2109 | **Course Unit Title**<br>Demography | **Semester/Year**<br>Fall / 2 | **Number of ECTS Credits**<br>3 |
| **Language of Instruction** | Turkish | | |
| **Type of Course Unit** | Elective | | |

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|---|---|---|---|---|---|
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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|---|---|
| **Course content** | This course explores the fundamental concepts and methods of demography, focusing on population dynamics, structure, and distribution. Topics include fertility, mortality, migration, population projections, and demographic transition models. Students will learn to collect, analyze, and interpret demographic data using statistical techniques. Additionally, the course examines the social, economic, and policy implications of demographic changes, providing insights into population trends and sustainable development strategies. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction to Demography and Basic Concepts |
| **2** | Population Growth and Decline, Population Pyramids, and Demographic Transition Model |
| **3** | Migration and Population Mobility |
| **4** | Types and Effects of Migration, Migration Policies and Immigrant Rights |
| **5** | Life Expectancy and Health Indicators |
| **6** | Access to Healthcare and Health Policies, Socioeconomic Impact of Aging Populations |
| **7** | Relationship Between Education and Demography, Education Policies, and Population Dynamics |
| **8** | Population Projections and Scenario Analysis |
| **9** | Predicting Future Demographic Trends |
| **10** | Population Policies and Sustainable Development Goals |
| **11** | Mid-term Project |
| **12** | Mid-term Project |
| **13** | Mid-term Project |
| **14** | Mid-term Project |

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| **Course Resources** | Demography: The Study of Human Population – David Yaukey, Douglas L. Anderton<br>Population and Society: An Introduction to Demography – Dudley L. Poston, Jr., Leon F. Bouvier |

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| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |

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|---|---|---|---|
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 50 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 50 |

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|---|---|
| **Course Outcome** | 1-Define fundamental demographic concepts such as population size, fertility, mortality, and migration.<br>2-Collect and analyze real-world demographic data using appropriate statistical methods.<br>3-Apply demographic models (e.g., population projections) to predict future population trends.<br>4-Utilize demographic knowledge in policy-making and planning.<br>5-Critically assess demographic challenges and propose solutions. |
| **Aims of the course** | The aim of this course is to provide students with a comprehensive understanding of demographic concepts, population dynamics, and their social, economic, and environmental impacts. Students will learn to collect, analyze, and interpret demographic data, gaining essential skills for population studies, policy-making, and future demographic projections. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |

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| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | X |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | **Contribution of the course**: 1:No 2:Partially 3:Completely | |

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|---|---|---|---|---|---|
| **Department**<br>Department of Statistics | | | | **Date** | |
| **Course Unit Code**<br>IST2111 | **Course Unit Title**<br>Time Series Analysis | | **Semester/Year**<br>Fall / 2 | **Number of ECTS Credits**<br>3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Elective | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | This course covers the fundamental concepts and techniques of time series analysis, focusing on modeling and forecasting time-dependent data. Topics include time series components, exploratory data analysis, smoothing techniques, ARIMA and SARIMA models, autocorrelation analysis, and machine learning approaches. Students will apply these methods |

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| | using statistical software to analyze real-world time series data and evaluate model performance |

| Weekly Detailed Course Contents | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction and Basic Concepts |
| **2** | Components of Time Series |
| **3** | Moving Average and Exponential Smoothing |
| **4** | Autocorrelation and Partial Autocorrelation |
| **5** | ARIMA Models - I |
| **6** | ARIMA Models - II |
| **7** | Seasonal ARIMA (SARIMA) Models |
| **8** | GARCH Models |
| **9** | State-Space Models and Kalman Filter |
| **10** | Multivariate Time Series and VAR Models |
| **11** | Machine Learning Methods in Time Series Analysis |
| **12** | Case Studies - I |
| **13** | Case Studies - II |
| **14** | Student Project Presentations |

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| **Course Resources** | Time Series Analysis and Its Applications – Robert H. Shumway, David S. Stoffer<br>Forecasting: Principles and Practice – Rob J. Hyndman, George Athanasopoulos |

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| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. | | |

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| | In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 75 |
| | **Computer Sciences** | 25 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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| **Course Outcome** | 1-Identify and differentiate the basic components of time series data (trend, seasonality, cyclic, and random components).<br>2-Understand the principles of moving average, exponential smoothing, ARIMA, and SARIMA models.<br>3-Evaluate the performance of ARIMA and SARIMA models using criteria such as AIC and BIC.<br>4-Apply time series analysis using statistical software tools.<br>5-Make forecasts using time series models and assess their accuracy. |
| **Aims of the course** | The aim of this course is to provide students with a comprehensive understanding of time series analysis, including its fundamental concepts, modeling techniques, and forecasting methods. Students will learn to analyze time-dependent data, apply various statistical models such as ARIMA and SARIMA, and use software tools to implement and evaluate time series models for practical applications. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| | Learning outcomes | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | X |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |

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|---|---|---|---|---|
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

| **Department** | | | **Date** | |
|---|---|---|---|---|
| Department of Statistics | | | | |
| **Course Unit Code** | **Course Unit Title** | **Semester/Year** | **Number of ECTS Credits** | |
| IST2113 | System Reliability-I | Fall / 2 | 3 | |
| **Language of Instruction** | Turkish | | | |
| **Type of Course Unit** | Elective | | | |
| **Prerequisites and co-requisites** | - | | | |
| **Address of course** | - | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | This course covers the fundamental principles and mathematical foundations of system reliability analysis. Topics include reliability concepts, common life distributions, system reliability models (series and parallel systems), and methods for evaluating and improving system performance. Students will learn about advanced techniques such as minimal path and minimal cut analysis, Markov chains, redundancy optimization, and reliability bounds. Practical applications will be emphasized through case studies and project-based learning, enabling students to analyze, model, and optimize real-world system reliability problems. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Mathematics of Reliability |
| **2** | Reliability Concepts, Common Life Distributions |
| **3** | Complex Analysis |
| **4** | Basic System Reliability Models |
| **5** | Series System Model, Parallel System Model |
| **6** | General Methods for System Reliability Evaluation, Parallel and Series Reductions, Pivotal Decomposition |

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|---|---|
| **7** | Generating Minimal Paths and Minimal Cuts, Inclusion-Exclusion Method |
| **8** | Sum of Disjoint Product Method, Markov Chain Imbeddable Structures |
| **9** | Delta-Star and Star-Delta Transformations, System Reliability Bounds |
| **10** | General Methodology for System Design, Redundancy in System Design, Component Importance Measures |
| **11** | Majorization and Its Application in Reliability, Importance of Reliability in Optimal Design |
| **12** | Binary Rearrangement in Optimal Design, Optimal Arrangements for Series and Parallel Systems |
| **13** | Project Studies |
| **14** | Student Project Presentations |

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| **Course Resources** | Mathematical Models for Systems Reliability – Benjamin Epstein, Ishay Weissman<br>System Reliability Theory – Marvin Rausand<br>Optimal Reliability Modeling – Way Kuo, Ming J. Zuo |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | 1-Understand and explain fundamental reliability concepts and commonly used life distributions. |

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|---|---|
| | 2-Analyze and model the reliability of series, parallel, and complex systems.<br>3-Apply mathematical and statistical methods to evaluate and improve system reliability.<br>4-Utilize advanced techniques such as minimal path and minimal cut analysis, Markov chains, and redundancy optimization.<br>5-Develop and present reliability analysis projects based on real-world applications. |
| **Aims of the course** | The aim of this course is to provide students with a strong foundation in system reliability analysis by introducing key concepts, mathematical models, and evaluation methods. Students will learn to analyze, model, and optimize the reliability of various systems, applying theoretical knowledge to real-world problems through case studies and project-based learning. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | X |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| **Department**<br><br>Department of Statistics | | | **Date** |
|---|---|---|---|
| **Course Unit Code** | **Course Unit Title** | **Semester/Year** | **Number of ECTS Credits** |

| | | | | | |
|---|---|---|---|---|---|
| IST2115 | Combinatorial Probability | | Fall / 2 | 3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Elective | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | This course introduces fundamental combinatorial probability concepts, including set operations, counting rules, permutations, and combinations. Topics covered include binomial and multinomial theorems, Stirling numbers, Euler's function, probability spaces, classical probability, and geometric probability. Students will learn to apply combinatorial techniques to real-world probability problems and understand their theoretical foundations. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Basic Concepts: Finite Sets, Countable Sets, Set Operations, Counting Rule |
| **2** | Number of Elements in a Set, Equivalent Sets, Closed and Open Intervals, Interval Transformations |
| **3** | Permutations and Combinations |
| **4** | Concept and Properties of Characteristic Functions |
| **5** | Binomial Theorem |
| **6** | Geometric Interpretation of Combinations and Orbit Method |
| **7** | Multinomial Theorem |
| **8** | Drawing and Distribution Models |
| **9** | Addition and Subtraction Formulas, Second-order Stirling Numbers |
| **10** | Euler's Function |
| **11** | Probability in Finite and Countable Spaces |
| **12** | Simple Event, Sample Space, and Sigma Algebra |
| **13** | Classical Probability and Examples |
| **14** | Buffon's Needle Problem and Geometric Probability |

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| **Course Resources** | Introduction to Probability– Alifettah Shahbazov, Birsen Yayınevi |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |

| | | | |
|---|---|---|---|
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

| | |
|---|---|
| **Course Outcome** | 1-Understand and differentiate between simple and compound events.<br>2-Apply sigma algebra in probability theory.<br>3-Comprehend the concept of measure in finite sets.<br>4-Extend the measure concept from finite sets to more general spaces.<br>5-Utilize geometric probability by mapping certain probability problems onto geometric frameworks. |
| **Aims of the course** | The aim of this course is to develop students' ability to define all possible outcomes of an experiment and perform classical probability calculations. The course provides a strong foundation in combinatorial methods, enabling students to analyze probability problems through counting principles and combinatorial techniques. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | X |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |

| | | | | |
|---|---|---|---|---|
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | **Contribution of the course**: 1:No 2:Partially 3:Completely | |

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|---|---|---|---|---|---|
| **Department**<br>Department of Statistics | | | | **Date** | |
| **Course Unit Code**<br>IST2117 | **Course Unit Title**<br>Analysis of Variance | | **Semester/Year**<br>Fall / 2 | **Number of ECTS Credits**<br>3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Elective | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | This course introduces students to the theoretical foundations and practical applications of ANOVA, covering one-way, two-way, and repeated measures ANOVA. Topics include assumptions of ANOVA, hypothesis testing, significance tests, interaction effects, and post-hoc comparisons. Students will gain hands-on experience in data analysis and result interpretation using statistical software. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction to ANOVA: Basic Concepts and History |
| **2** | Types of ANOVA: One-Way ANOVA, Two-Way ANOVA, Repeated Measures ANOVA |
| **3** | Assumptions of ANOVA: Normality, Homogeneity, and Independence |
| **4** | ANOVA Hypotheses, Parameters, and Calculation Methods |
| **5** | One-Way ANOVA Analysis |
| **6** | Interpretation of ANOVA Results and Significance Tests |
| **7** | Two-Way ANOVA Analysis |
| **8** | Main Effects and Interaction Effects in Two-Way ANOVA |
| **9** | Repeated Measures ANOVA Analysis |
| **10** | Applications and Interpretation of Repeated Measures ANOVA |
| **11** | Midterm Project |
| **12** | Midterm Project |
| **13** | Midterm Project |
| **14** | Midterm Project |

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| **Course Resources** | Design and Analysis: A Researcher's Handbook – Geoffrey Keppel, William H. Saufley Jr., Howard Tokunaga<br>Introduction to the Practice of Statistics – David S. Moore, George P. McCabe, Bruce A. Craig |

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| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least | | |

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| | YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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| **Course Outcome** | 1-Understand the fundamental concepts and theoretical foundations of ANOVA.<br>2-Apply one-way, two-way, and repeated measures ANOVA and interpret the results.<br>3-Use ANCOVA to control for independent variable effects.<br>4-Analyze and interpret interaction effects between factors.<br>5-Apply post-hoc tests (Tukey, Bonferroni, etc.) to determine differences between groups. |
| **Aims of the course** | The aim of this course is to teach students the fundamental principles, types, and applications of analysis of variance (ANOVA) techniques, which are used to compare means across multiple groups and examine the effects of variables. By the end of the course, students will be able to apply ANOVA methods in data analysis, interpret results, and effectively report their findings. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | X |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |

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| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

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|---|---|---|---|---|---|
| **Department**<br>Department of Statistics | | | | **Date** | |
| **Course Unit Code**<br>YMH2119 | **Course Unit Title**<br>Data Structures | | **Semester/Year**<br>Fall / 2 | **Number of ECTS Credits**<br>3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Elective | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | This course provides an in-depth understanding of data structures and algorithms. It covers basic data structures such as arrays, linked lists, stacks, queues, heaps, and hash tables, along with searching and sorting techniques. Students will also explore tree structures, binary search trees, balanced trees, and graph algorithms like BFS and DFS. By the end of the course, students will be able to apply data structures effectively to solve computational problems. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction to Data Structures, Basic Data Types, and Concepts |
| **2** | Time and Space Complexities (Asymptotic Notations) |
| **3** | Arrays and Lists, Linked Lists (Single & Doubly Linked Lists) |
| **4** | Stack Data Structure and Applications |
| **5** | Queue Data Structure and Applications |
| **6** | Recursion Concept and Its Applications |
| **7** | Hashing, Hash Functions, and Applications |
| **8** | Priority Queues and Heap Trees |
| **9** | Tree Data Structures and Applications |

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| **10** | Binary Search Trees and Balanced Trees |
| **11** | Sorting Algorithms (Insertion, Selection, Bubble Sort) |
| **12** | Sorting Algorithms (Merge Sort, Quick Sort, Heap Sort, Radix Sort) |
| **13** | Greedy Algorithms and Graph Algorithms (BFS, DFS) |
| **14** | Shortest Path Algorithms (Dijkstra's Algorithm) |

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| **Course Resources** | Introduction to Algorithms – Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein (3rd Edition, MIT Press) |

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| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 25 |
| | **Computer Sciences** | 50 |
| | **Programming Design** | 25 |
| | **Social Sciences** | 0 |

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| **Course Outcome** | 1-Understand the fundamental concepts and importance of data structures.<br>2-Comprehend abstract data types and their role in programming.<br>3-Implement and utilize fundamental data structures such as arrays, linked lists, stacks, and queues.<br>4-Apply data structures to solve real-world computational problems.<br>5-Analyze and compare different sorting and searching algorithms based on efficiency. |

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| **Aims of the course** | The aim of this course is to introduce fundamental data structures used for storing and accessing data efficiently in computer memory. Students will learn about various data structures, their time and space complexities, and their applications in problem-solving. Topics covered include lists, linked lists, stacks, queues, recursion, sorting and searching algorithms, hash tables, binary trees, balanced trees, and graph algorithms. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | X |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| **Department** | | | **Date** |
|---|---|---|---|
| Department of Statistics | | | |
| **Course Unit Code** | **Course Unit Title** | **Semester/Year** | **Number of ECTS Credits** |
| IKT2123 | | Fall / 2 | 3 |

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|---|---|---|---|---|---|
| | Fundamental Macroeconomic Indicators | | | | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Elective | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | This course covers the fundamental concepts and indicators of macroeconomics, including GDP, inflation, employment, fiscal and monetary policies, and international trade. It explores classical and Keynesian economic models, IS-LM and AD-AS frameworks, business cycles, and macroeconomic equilibrium. Students will learn to measure economic activities, interpret macroeconomic data, and assess the implications of different economic policies. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction |
| **2** | History of Macroeconomics, Research Areas, and Key Assumptions |
| **3** | Measurement of Economic Activity, GDP, and Related Concepts |
| **4** | Measurement of Economic Relations with Other Countries: Balance of Payments and Exchange Rate |
| **5** | Classical Economic Assumptions: Labor Market, Goods Market, and Money Market |
| **6** | Keynesian Model: Aggregate Expenditures and Equilibrium Income Level |
| **7** | Formation of IS-LM Model, General Equilibrium, and Imbalances |
| **8** | Midterm Exam |
| **9** | IS-LM-BP Model, Trade of Goods, and Capital Movements |
| **10** | AD-AS Model Analysis and Multiplier Mechanism |
| **11** | Business Cycle Theories: Unemployment, Inflation, and Indexation Processes |
| **12** | Aggregate Demand, Pigou Effect, and Short-Term Supply Models |
| **13** | Money, Inflation, and Interest Rates: Strategies for Reducing Inflation and Policy Implications |
| **14** | Budget Deficits, External Deficits, and Flow-Stock Equilibrium |

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| **15** | Economic Growth and Neoclassical Growth Model |

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| **Course Resources** | Macro Economy – Yıldırım, K., Karaman, D., Taşdemir, M. (2013) |

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| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 70 |
| | **Computer Sciences** | 30 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | 1-Understand the history, assumptions, and research areas of macroeconomics and their relationship with economic variables.<br>2-Measure economic activity and interpret macroeconomic indicators.<br>3-Analyze international economic relations and assess their impact on economic decision-making.<br>4-Evaluate markets within the framework of classical economic theory and discuss their short- and long-term effects.<br>5-Assess markets through Keynesian economic theory and analyze the impact of macroeconomic equilibrium. |
| **Aims of the course** | The aim of this course is to analyze macroeconomic events and phenomena by incorporating current economic issues. The course will provide students with an |

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|---|---|
| | understanding of key macroeconomic indicators and their impact on economic policies and decision-making. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | X |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | X |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| **Department**<br>Department of Statistics | | | **Date** |
|---|---|---|---|
| **Course Unit Code**<br>MAT2135 | **Course Unit Title**<br>Real Analysis | **Semester/Year**<br>Fall / 2 | **Number of ECTS Credits**<br>3 |
| **Language of Instruction** | Turkish | | |
| **Type of Course Unit** | Elective | | |

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|---|---|---|---|---|---|
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | This course introduces key concepts of real analysis, focusing on measure theory, integration, and their applications. Topics include measure and sigma-algebras, Lebesgue measure, measurable functions, Riemann and Riemann-Stieltjes integrals, stochastic integration, and Itô calculus. Students will apply these concepts to solve complex mathematical problems and develop models in dynamic systems. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Concept of Measure and Its Properties |
| **2** | Measure in the Plane, Algebraic Structure |
| **3** | Necessity of Sigma-Algebras, Inner and Outer Measure |
| **4** | Open and Closed Sets, lim inf and lim sup Concepts |
| **5** | Measurable Sets |
| **6** | Lebesgue Measure and Lebesgue Measurable Sets |
| **7** | Measurable Functions and Random Variables |
| **8** | Riemann Integrable Functions |
| **9** | Riemann-Stieltjes Integral and Expectation of a Random Variable |
| **10** | Quadratic Mean Convergence |
| **11** | Examples Using Quadratic Mean Convergence |
| **12** | Concept of Stochastic Integration |
| **13** | Itô Integral |
| **14** | Problems Solvable with Itô Integral |

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| **Course Resources** | Introduction to Probability, Alifettah Shahbazov, Birsen Yayınevi |

| | **In-Term studies** | Quantity | **Percentage (%)** |
|---|---|---|---|

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|---|---|---|---|
| **Assessment Methods and Criteria** | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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| **Course Outcome** | 1-Gain a comprehensive understanding of the integral concept and its applications.<br>2-Determine the appropriate mathematical structure needed for solving various problems.<br>3-Develop models for dynamic systems, including applications in finance.<br>4-Understand the concept of stochastic integration.<br>5-Analyze and apply the concept of quadratic mean convergence. |
| **Aims of the course** | The aim of this course is to build the necessary mathematical foundation for understanding instantaneous changes in functions and structures. Students will develop a deep understanding of measure theory, integration, and stochastic processes, which are essential for advanced mathematical analysis and applications in fields like finance and probability theory. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |

| | | | | |
|---|---|---|---|---|
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | X |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | **Contribution of the course**: 1:No 2:Partially 3:Completely | |

**SEMESTER 4**

| **Department**<br>Department of Statistics | | | **Date** | | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>İST 2102 | **Course Unit Title**<br>SURVEY DESIGN | | **Semester/Year**<br>Spring/ 2 | **Number of ECTS Credits**<br>3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | Associate Professor Ayşe BUGATEKIN | | | | |

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| **Assistants** | - |

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| **Course content** | An introduction to sampling theory will be provided, and how different sampling techniques are used in statistical analysis will be examined. Practical topics such as survey design, data collection processes, and computer coding of survey results will be covered. Case studies and presentations will be used to demonstrate how theoretical knowledge is applied in practice within the scope of student projects. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | General definitions and concepts |
| **2** | Introduction to simple random sampling |
| **3** | Population calculation in simple random sampling |
| **4** | Application of simple random sampling to population proportion |
| **5** | Introduction to stratified sampling |
| **6** | Application of stratified sampling to population mean |
| **7** | Application of stratified sampling for population proportion |
| **8** | Introduction to stratified sampling |
| **9** | Single-stage sampling methods |
| **10** | Single stage sampling methods Application for population mean and proportion |
| **11** | Survey methods, advantages and disadvantages |
| **12** | Areas of use of surveys and presentations of student projects |
| **13** | Main steps of the survey and presentations of student projects |
| **14** | Computer coding of survey results and presentations of student projects |

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| **Course Resources** | Özer Serper ve ark., 2013, Örnekleme, Ezgi Kitabevi Yayınları |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be | | |

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|---|---|
| | evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Statistics and Basic Sciences** | 70 |
| | **Computer Sciences** | 30 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

| | |
|---|---|
| **Course Outcome** | Survey design program output enables the creation of structured survey forms that are appropriate for the target audience and collect valid and reliable data. |
| **Aims of the course** | To teach sampling methods to select a sample in a statistical study, to use appropriate sampling methods and to learn how to design a survey. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | X |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| **Department**<br>Department of Statistics | | | | **Date** | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>İST 2104 | **Course Unit Title**<br>EXPERIMENTAL DESIGN | | **Semester/Year**<br>Spring/ 2 | **Number of ECTS Credits**<br>6 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | Associate Professor Ayşe BUGATEKIN | | | | |
| **Assistants** | - | | | | |

| **Course content** | The Experimental Design course teaches how to design experiments to obtain valid and reliable results in scientific research. Topics include generating hypotheses, determining dependent and independent variables, randomization, blocking, factorial designs, and statistical methods such as analysis of variance. The course includes practical work, focusing particularly on control groups, minimizing experimental errors, and data analysis techniques. |
|---|---|

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction to Experimental Design |
| **2** | Factorial Experimental Design - I |
| **3** | Factorial Experimental Design - II |
| **4** | Repeated Measures Design |
| **5** | Block Design |
| **6** | Latin Squares and Other Experimental Design Tools - I |
| **7** | Latin Squares and Other Experimental Design Tools - II |
| **8** | Experimental Design and Data Collection |
| **9** | Analysis of Experimental Results - I |
| **10** | Analysis of Experimental Results - II |
| **11** | Application and Project |
| **12** | Application and Project |
| **13** | Project Presentation |
| **14** | Project Presentation |

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| **Course Resources** | Design and Analysis of Experiments" by Douglas C. Montgomery, “Experimental Design: Procedures for the Behavioral Sciences" by Roger E. Kirk, “Statistical Methods for Psychology" by David C. Howell |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Statistics and Basic Sciences** | 50 |
| | **Computer Sciences** | 30 |
| | **Programming Design** | 20 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | Students gain the ability to plan, apply and analyze appropriate experimental design techniques to obtain reliable and valid results in scientific research. |
| **Aims of the course** | It aims to develop students' ability to design experiments that they can use effectively in the scientific research process by teaching them the basic principles, methods and applications of experimental design. Students will understand the basic concepts of experimental design and gain practical experience in planning, implementing and analyzing the results of various experiments. |
| **The way of processing course** | Face to face |

| Relation of the course with program outcomes | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | X |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| **Department**<br>Department of Statistics | | | | **Date** | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>İST 2106 | **Course Unit Title**<br>Mathematical Statistics-II | | **Semester/Year**<br>Spring/ 2 | **Number of ECTS Credits**<br>6 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |

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|---|---|---|---|---|---|
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | Mathematical Statistics course covers the mathematical foundations of statistical theory. It covers topics such as probability theory, random variables, probability distributions, moments, sampling theory, estimation methods (method of moments, maximum likelihood estimation), confidence intervals, hypothesis testing and asymptotic theory. The course provides analytical thinking skills to understand and apply the mathematical foundations of statistical methods. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | T distribution, chi-square distribution, confidence interval for variance |
| **2** | F distribution, confidence interval for two variances |
| **3** | Introduction to parameter estimates, point estimates, and estimation methods |
| **4** | Maximum likelihood method |
| **5** | Newton-Raphson method, method of moments |
| **6** | December forecast |
| **7** | Properties of estimators: Unbiasedness, efficiency |
| **8** | Minimum variance, adequacy, consistency, Cramer Rao |
| **9** | Fisher information matrix and its applications |
| **10** | Limit distributions, probability convergence, convergence in distribution |
| **11** | Law of Large Numbers, Central Limit Theorem |
| **12** | Important inequalities: Chebyshev's Theorem, Markov's inequality |
| **13** | Goodness of fit test |
| **14** | Goodness of fit test |

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| **Course Resources** | Mathematical Statistics with Applications - Dennis Wackerly, William Mendenhall, Richard L. Scheaffer, Probability and Statistics for Engineering and the Sciences - Jay L. Devore |

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| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |

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| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. |

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|---|---|---|
| **Percentage of Course Category (%)** | **Statistics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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| **Course Outcome** | By understanding the mathematical foundations of probability and statistical inference, students become able to derive, analyze, and apply statistical methods. |
| **Aims of the course** | It introduces students to the theoretical and applied aspects of statistical distributions for discrete and continuous random variables. It also covers fundamental topics such as point and interval estimations, hypothesis testing, and regression analysis. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | X |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | X<br>X |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |

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|---|---|---|---|---|
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

| **Department** Department of Statistics | | | **Date** | |
|---|---|---|---|---|
| **Course Unit Code** İST 2108 | **Course Unit Title** Statistical Software | **Semester/Year** Spring/ 2 | **Number of ECTS Credits** 3 | |
| **Language of Instruction** | Turkish | | | |
| **Type of Course Unit** | Compulsory | | | |
| **Prerequisites and co-requisites** | - | | | |
| **Address of course** | - | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | Associate Professor Ayşe BUGATEKIN | | | |
| **Assistants** | - | | | |

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| **Course content** | This course covers the basic features and applications of software used for statistical data analysis. In the first weeks, basic topics such as introduction to statistical package programs, data entry procedures, descriptive statistics, and creating graphs and tables are covered. In the middle weeks, normality tests, parametric and nonparametric hypothesis tests, variance analysis, and multiple comparison tests are applied. In the last weeks, advanced statistical methods such as repeated measures variance analysis, Kruskal-Wallis test, chi-square test, regression and correlation analysis are covered to develop students' software-supported analysis skills. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction of statistical package programs |
| **2** | Performing data entry |
| **3** | Calculating Descriptive Statistics |

| | |
|---|---|
| **4** | Creating a chart |
| **5** | Creating a table |
| **6** | Application of normality test |
| **7** | Application of Single and Two Sample Parametric Hypothesis Testing |
| **8** | Application of Single and Two Sample Nonparametric Hypothesis Testing |
| **9** | Analysis of variance and multiple comparison tests |
| **10** | Analysis of variance and multiple comparison tests |
| **11** | Variance in repeated measurements |
| **12** | Kruskal-Wallis test |
| **13** | Chi-square test |
| **14** | Regression and Correlation |

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| **Course Resources** | Giri, N. C. (2003). *Multivariate statistical analysis* |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Statistics and Basic Sciences** | 50 |
| | **Computer Sciences** | 30 |
| | **Programming Design** | 20 |
| | **Social Sciences** | 0 |

| | |
|---|---|
| **Course Outcome** | Students gain the ability to analyze data using statistical software, create statistical models, and visualize and interpret results. |
| **Aims of the course** | Introduction and use of statistical analysis programs |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | X |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| **Department**<br>Department of Statistics | | | **Date** |
|---|---|---|---|
| **Course Unit Code**<br>İST 2110 | **Course Unit Title**<br>Econometric Models | **Semester/Year**<br>Spring/ 2 | **Number of ECTS Credits**<br>3 |
| **Language of Instruction** | Turkish | | |
| **Type of Course Unit** | Compulsory | | |

| | | | | | |
|---|---|---|---|---|---|
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | Associate Professor Ayşe BUGATEKIN | | | | |
| **Assistants** | - | | | | |

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| **Course content** | The Econometric Models course teaches basic econometric methods and models used for analyzing economic data. The course covers topics such as simple and multiple regression analysis, model assumptions, heteroskedasticity and autocorrelation, as well as simultaneous equation models and time series analysis. Students develop the ability to interpret and analyze economic data by using theoretical knowledge in practical studies. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Time Series Models |
| **2** | Time Series Models: Classification I |
| **3** | Time Series Models: Classification II |
| **4** | Univariate Time Series Models I |
| **5** | Univariate Time Series Models II |
| **6** | Multivariate Time Series Models I |
| **7** | Multivariate Time Series Models II |
| **8** | Volatility |
| **9** | Volatility Modeling |
| **10** | Time-varying Volatility Modeling |
| **11** | Univariate GARCH Models I |
| **12** | Univariate GARCH Models II |
| **13** | Multivariate GARCH Models I |
| **14** | Multivariate GARCH Models II |

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| **Course Resources** | Gujarati, D. N. (çev. Şenesen, Ü., Şenesen, G. G.) (1999),Temel Ekonometri. Literatür Yayıncılık |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |

| | | | |
|---|---|---|---|
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Statistics and Basic Sciences** | 50 |
| | **Computer Sciences** | 20 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 30 |

| | |
|---|---|
| **Course Outcome** | By gaining the ability to create, evaluate and interpret econometric models to analyze economic data, students can apply statistical methods to better understand economic relationships. |
| **Aims of the course** | Statistical modeling of econometric data and interpretation within the framework of statistical theories |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | X |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |

| | | | | |
|---|---|---|---|---|
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

| **Department** | | | **Date** | | |
|---|---|---|---|---|---|
| Department of Statistics | | | | | |
| **Course Unit Code** | **Course Unit Title** | | **Semester/Year** | **Number of ECTS Credits** | |
| İST 2112 | Statistical Quality Control | | Spring/ 2 | 3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | The Statistical Quality Control course teaches the application of statistical methods to ensure quality in manufacturing and service processes. Students gain the ability to effectively apply quality improvement techniques by learning topics such as the use of control charts, process capacity analysis, hypothesis testing, and sampling plans. The course emphasizes the use of statistical analysis in the management of quality control processes. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction to quality control and basic concepts |
| **2** | Process control and quality management, definition and basic functions of the PSP program |

| | |
|---|---|
| **3** | Important statistical methods in quality control, concepts of mean, standard deviation, variance |
| **4** | How to perform statistical analysis on the PSPP program |
| **5** | Control charts and process monitoring |
| **6** | Xbar-R, Xbar-S control charts, how to create control charts with PSPP program |
| **7** | Process capability and Calibration, Cp, Cpk, Pp, Ppk indexes |
| **8** | How to conduct process capability analyses with the PSPP program |
| **9** | Quality planning and having a correct quality system, ISO quality standards and process development techniques |
| **10** | Data analysis and process improvement techniques with the PSPP program |
| **11** | Mid-term project |
| **12** | Mid-term project |
| **13** | Mid-term project |
| **14** | Mid-term project |

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|---|---|
| **Course Resources** | Introduction to Statistical Quality Control - Douglas C. Montgomery, Quality Control and Industrial Statistics - Acheson J. Duncan |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| | **Statistics and Basic Sciences** | 60 |
| | **Computer Sciences** | 20 |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Programming Design** | 20 |
| | **Social Sciences** | 0 |

| | |
|---|---|
| **Course Outcome** | Students gain the ability to evaluate, control and improve quality in production and service processes using statistical quality control methods. With this knowledge, they can make effective decisions on quality management and process optimization. |
| **Aims of the course** | To provide students with the ability to apply statistical analysis and quality control techniques using PSPP software. This course aims to teach quality control processes and tools, and to develop students' ability to analyze and interpret data. Students will be able to effectively manage quality control processes using basic and advanced features of PSPP software. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | X | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | X | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

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|---|---|---|
| **Department** | | **Date** |

| Department of Statistics | | | | | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>İST 2114 | **Course Unit Title**<br>System Reliability-II | | **Semester/Year**<br>Spring/ 2 | **Number of ECTS Credits**<br>3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | Associate Professor Ayşe BUGATEKIN | | | | |
| **Assistants** | - | | | | |

| **Course content** | System Reliability-II course covers advanced topics on system reliability and durability. Students gain the ability to evaluate and improve the reliability of complex systems by learning reliability functions, maintenance strategies, failure analysis, life cycle costs, and reliability testing methods. In addition, integration of reliability principles in system design and risk analysis are also covered. |
|---|---|

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | System models with n to k outputs, Evaluation of system reliability |
| **2** | Relationship between n-to-k output G and n-to-k output F systems, Non-repairable n-to-k output system models |
| **3** | Repairable n-to-k output system models, Weighted n-to-k output system models |
| **4** | Design of systems with n to k outputs |
| **5** | Design of systems with n to k outputs |
| **6** | Sequential n to k output system models |
| **7** | Sequential n to k output system models |
| **8** | Multidimensional n to k output system models |
| **9** | Other n to k output system models |
| **10** | Other sequential n to k output system models |
| **11** | Multidimensional n to k output system models |
| **12** | Multidimensional n to k output system models |
| **13** | Project Studies |
| **14** | Student Project Presentations |

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|---|---|
| **Course Resources** | "Mathematical Models For Systems Reliability" – Benjamin Epstein, Ishay Weissman, "System Reliability Theory" -Marvin Rausand, Marvin Rausand, "Optimal Reliability Modeling" WAY KUO, MING J. ZUO |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Statistics and Basic Sciences** | 80 |
| | **Computer Sciences** | 20 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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| **Course Outcome** | Students acquire the knowledge and competencies required to increase the resilience of complex systems by gaining the ability to evaluate the reliability of systems, develop maintenance strategies and apply reliability testing methods. With this knowledge, they can contribute to reliability-oriented design and management processes. |
| **Aims of the course** | It aims to teach students the basic and advanced concepts of the Z transform, its various application areas and how to apply this transform. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |

| | | | | |
|---|---|---|---|---|
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | X |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | **Contribution of the course**: 1:No 2:Partially 3:Completely | |

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|---|---|---|---|---|---|
| **Department**<br>Department of Statistics | | | | **Date** | |
| **Course Unit Code**<br>İST 2116 | **Course Unit Title**<br>Axiomatic Probability | | **Semester/Year**<br>Spring/ 2 | **Number of ECTS Credits**<br>3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | Associate Professor Ayşe BUGATEKIN | | | | |
| **Assistants** | - | | | | |

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| **Course content** | The Axiomatic Probability course covers the basic principles and axioms of probability theory in a mathematical framework. Students can grasp the structural foundations of probability theory by learning topics such as basic concepts in the field of probability, union and intersection of events, conditional probability, independence and probability distributions. In addition, a theoretical and practical understanding is developed by examining the applicability of probability calculation methods together with the axiomatic structure. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | The concept of measurement and measured value. Measurable sets. |
| **2** | Algebra and sigma algebra structures. |
| **3** | Function that can be measured. |
| **4** | A measure of probability. |
| **5** | Distribution function |
| **6** | Empirical distribution function. |
| **7** | Probability function and its properties. Continuity theorem. |
| **8** | Concepts of liminf and limsup. |
| **9** | Independence of two events and complete independence. |
| **10** | Stieltjes integral and the exact expectation value formula. |
| **11** | Bernoulli's theorem and inequalities. |
| **12** | Poisson's theorem. |
| **13** | Moivre Laplace theorem |
| **14** | Normal distribution and its properties. |

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| **Course Resources** | Olasılığa Giriş, Alifettah Shahbazov, Birsen Yayınevi. |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the | | |

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| | instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. |

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|---|---|---|
| **Percentage of Course Category (%)** | **Statistics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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| **Course Outcome** | By understanding the axiomatic basis of probability theory, students gain the ability to apply probability calculation methods and analyze relationships between events. This knowledge can be used effectively in statistical analysis and probability-based decision-making processes. |
| **Aims of the course** | Axiomatic justification of the concept of probability and definition of auxiliary materials for probability. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | X |
| **2** | Indicates the place and importance of statistics in professional life. | | | X |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | X |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| **Department**<br>Department of Statistics | | | **Date** | | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>İST 2118 | **Course Unit Title**<br>Nonparametric Statistical Methods | | **Semester/Year**<br>Spring/ 2 | **Number of ECTS Credits**<br>5 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | Associate Professor Ayşe BUGATEKIN | | | | |
| **Assistants** | - | | | | |

| **Course content** | The Nonparametric Statistical Methods course teaches statistical analysis methods that do not require distributional assumptions. Students will learn topics such as nonparametric tests, sampling methods, ranking statistics, and hypothesis testing, and will gain the ability to develop more flexible and robust approaches to data analysis. This course focuses on applying appropriate analysis techniques, especially for small sample sizes or situations where the distribution is unknown. |
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| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Basic Concepts |
| **2** | Difference Between Parametric and Nonparametric Statistical Methods |
| **3** | Levels of measurement |
| **4** | One Sample Tests: Sign Test, Wilcoxon Signed Rank Test |
| **5** | Independent Two Sample Tests: Median Test, Mann-Whitney U Test |
| **6** | Independent Two Sample Tests: Mood Test, Moses Test |
| **7** | Dependent Two Sample Tests: Sign Test, Wilcoxon Sequential Sign Test |
| **8** | Application |
| **9** | Chi-square Tests for Independence |
| **10** | Independent k Sample Tests: Kruskal-Wallis Test (H Statistic) |

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|---|---|
| **11** | Sampling distribution of H Statistic and its Approximation to Chi-Square Statistic |
| **12** | Friedman S Test |
| **13** | Sampling distribution of S Statistic and its Approximation to Chi-Square Statistic |
| **14** | Goodness of Fit Tests |

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| **Course Resources** | W. J. Conover (1998). Practical Nonparametric Statistics,Wiley; 3rd edition. |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Statistics and Basic Sciences** | 70 |
| | **Computer Sciences** | 30 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | Students gain the ability to analyze data without relying on distributional assumptions and to interpret results by applying nonparametric tests. This knowledge enables them to make effective statistical decisions, especially for small sample sizes or unknown distributions. |
| **Aims of the course** | To provide the ability to select appropriate tests and apply nonparametric tests in testing hypotheses. |
| **The way of processing course** | Face to face |

| Relation of the course with program outcomes | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | X |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| **Department**<br>Department of Statistics | | | | **Date** | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>YMH2120 | **Course Unit Title**<br>Database Management Systems | | **Semester/Year**<br>Spring / 2 | **Number of ECTS Credits**<br>3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Optional | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |

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|---|---|---|---|---|---|
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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|---|---|
| **Course content** | Database design, SQL query, normalization, relational database management systems and big data management topics are covered |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Providing information about database concepts |
| **2** | Database processing |
| **3** | Fundamentals of Relational Implementation |
| **4** | Fundamentals of Relational Implementation |
| **5** | Query Languages (MS SQL) |
| **6** | Query Languages (MS SQL) |
| **7** | Data Modeling, Normalization |
| **8** | Data Modeling, Normalization |
| **9** | Normalization |
| **10** | Databases and Internet Technology |
| **11** | Databases and Internet Technology |
| **12** | Managing Multi-User Databases |
| **13** | Managing Multi-User Databases |
| **14** | Managing databases with MS SQL |

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| **Course Resources** | **Kroenke, D. M., "Database Processing: Fundamentals, Design and Implementation", Prentice Hall** |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the | | |

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| | teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 40 |
| | **Computer Sciences** | 40 |
| | **Programming Design** | 20 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | Understanding the basic concepts and components of database systems.<br><br>Understanding hierarchical, network, relational and object-oriented database models.<br><br>Basic principles, components and operation of relational databases.<br><br>Ability to design databases using data modeling and ER (Entity-Relationship) diagrams. |
| **Aims of the course** | The primary purpose of this course is to explain database systems and teach the use of Entity - Relation and relational data models in order to produce logical solutions to problems on databases. It is planned to move on to stages such as creating tables to hold data with the given methods, establishing relationships between tables and making queries in the established database. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | X |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |

| | | | | |
|---|---|---|---|---|
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

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|---|---|---|---|---|---|
| **Department**<br>Department of Statistics | | | | **Date** | |
| **Course Unit Code**<br>İKT2124 | **Course Unit Title**<br>ECONOMIC SYSTEMS | | **Semester/Year**<br>Spring / 2 | **Number of ECTS Credits**<br>3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Optional | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | The basic concepts of economic systems, comparison of different systems such as capitalism, socialism and mixed economy, their historical development and their effects on today's economies are examined. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction |
| **2** | Basic concepts: System, structure, regime |

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|---|---|
| **3** | The birth of liberal capitalism |
| **4** | Theoretical background of liberal capitalism |
| **5** | Developments leading to the transition of capitalism to the interventionist stage |
| **6** | Theoretical foundations of interventionist capitalism |
| **7** | Interventionist capitalism in practice: Social State |
| **8** | Interventionist capitalism in practice: Social State |
| **9** | The crisis of interventionist capitalism; neoliberalism |
| **10** | Socialist thought, utopian socialists |
| **11** | Marxist Thought |
| **12** | Socialism in practice: USSR |
| **13** | Market socialism debates |
| **14** | Neoliberal Globalization |

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| **Course Resources** | Nalân Ölmezoğulları (2009) İktisadi Sistemler ve Küreselleşen kapitalizm, Ezgi Yay. Bursa<br>Gülten Kazgan(2002) '' Küreselleşme ve Yeni Ekonomik Düzen'' İstanbul Bilgi Üniversitesi Yayınları |

| | | | |
|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 50 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 50 |

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| **Course Outcome** | They can learn the transformative effects of political and economic institutions on the economic system<br>They can analyze the institutions in the current capitalist economic order and learn their historical evolution<br>They can compare the unique institutions in economic systems and explain the positive and negative aspects of these institutions<br>They can explain the institutions that cause differences between current economic systems<br>They can evaluate the historical evolution of transition economies |
| **Aims of the course** | The main purpose of this course is to provide information about theoretical debates on capitalism and socialism and to evaluate the performance of capitalism, socialism and transition economies in practice. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | X | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| Department<br>Department of Statistics | | | | Date | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>MAT2136 | **Course Unit Title**<br>Z Transform | | **Semester/Year**<br>Spring / 2 | **Number of ECTS Credits**<br>3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Optional | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

| **Course content** | Basic concepts of the Z transform, difference equations and their applications in discrete-time systems are discussed. |
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| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction and Basic Concepts |
| **2** | Mathematical Fundamentals of the Z Transform |
| **3** | Properties of the Z Transform |
| **4** | Inverse Transform of the Z Transform |
| **5** | System Analysis and the Z Transform |
| **6** | Rational Z Transforms and Pole-Zero Analysis |
| **7** | Practical examples and applications |
| **8** | Applications of the Z Transform: Filter Design |
| **9** | Applications of the Z Transform: Signal Processing |
| **10** | Applications of the Z Transform: Control Systems |
| **11** | Applications of the Z Transform: Telecommunications |
| **12** | Advanced Topics and Special Techniques |
| **13** | Project Studies and Case Studies |
| **14** | Student Project Presentations |

| **Course Resources** | **"Digital Signal Processing: Principles, Algorithms, and Applications" - John G. Proakis, Dimitris G. Manolakis**<br><br>**"Discrete-Time Signal Processing" - Alan V. Oppenheim, Ronald W. Schafer** |
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| | **"Signals and Systems" - Alan V. Oppenheim, Alan S. Willsky, S. Hamid Nawab** |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | To be able to explain the basic concepts and uses of the Z transform.<br><br>To be able to understand the mathematical foundations of the Z transform.<br><br>To be able to explain the role of the Z transform in system analysis.<br><br>To be able to understand the statistical analyses related to the Z transform. |
| **Aims of the course** | It aims to teach students the basic and advanced concepts of the Z transform, its various application areas and how to apply this transform. |
| **The way of processing course** | Face to face |

| Relation of the course with program outcomes | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | X |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

**SEMESTER 5**

| **Department**<br>Department of Statistics | | | **Date** |
|---|---|---|---|
| **Course Unit Code**<br>İST3101 | **Course Unit Title**<br>Optimization | **Semester/Year**<br>Fall / 3 | **Number of ECTS Credits**<br>6 |
| **Language of Instruction** | Turkish | | |
| **Type of Course Unit** | Compulsory | | |
| **Prerequisites and co-requisites** | - | | |
| **Address of course** | - | | |

| Local Credit | Theoretical | Practical | Laboratory | Presentation | Project |
|---|---|---|---|---|---|
| 4 | 4 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | Optimization techniques, mathematical modeling, linear and nonlinear programming, constrained and unconstrained optimization methods, and engineering and economic applications are examined. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | History of Optimization, Optimization Problems, Formulation of an Optimization Problem, Mathematical Model, Properties and Assumptions, Classification of Optimization Problems |
| **2** | Local and Global Optimality, Existence of Optimal Solution, Level Sets and Gradients, Convex Sets, Functions and Problems, First-order Characterization of a Convex Function, Second-order Characterization of a Convex Function |
| **3** | Algorithms and Complexity, Average Running Time, Random Algorithms, Fundamentals of Computational Complexity Theory, Complexity of Local Optimization, Optimal Methods for Nonlinear Optimization |
| **4** | Introduction to Linear Programming, Formulation of Linear Programming Model, Identification of Decision Variables, Formulation of Objective Function, Specification of Constraints |
| **5** | Formulation of Exact Linear Programming, Examples of Linear Programming Models, A Diet Problem, A Resource Allocation Problem, A Scheduling Problem, A Mixing Problem problem |
| **6** | A transportation problem, A production planning problem, Practical results of using linear programming models, Solving linear programming models with two variables graphically, Classification of linear programming models |
| **7** | The Simplex Method for Linear Programming, Standard form of linear programming, Simplex Method, Geometry of the Simplex Method, Simplex method for general linear programming |
| **8** | Two-phase simplex method, Big M method, Fundamental theorem of linear programming, Revised Simplex Method, Complexity of the Simplex Method |
| **9** | Duality in Linear Programming, Defining Binary Linear Programming, Constructing the dual of a general linear programming, Sensitivity Analysis, Changing the objective function coefficient of a basic variable, Changing the objective function coefficient of a non-basic variable |
| **10** | Sensitivity Analysis, Changing the column of a non-basic variable, Changing the right-hand side, Introducing a new variable, Introducing a new constraint |
| **11** | Unconstrained Optimization, Optimality Conditions, First-order necessary conditions, Second order optimality conditions, Using optimality conditions to solve optimization problems, Univariate Optimization Problems, Golden section search, Fibonacci search, Algorithmic Strategies for Unconstrained Optimization, Steepest Descent Method, Convex quadratic case |
| **12** | Newton Method, Levenberg-Marquardt Method, Conjugate Direction Method, Conjugate direction method for convex quadratic problems, Conjugate gradient algorithm, Non-quadratic problems, Quasi-Newton Methods, Rank-one correction formula |
| **13** | Constrained Optimization, Optimality Conditions, First-order necessary conditions, Second-order conditions |
| **14** | Duality |

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| **Course Resources** | **Numerical Methods and Optimization An Introduction** |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | Classification of optimization problems<br>Concepts related to functions<br>Algorithms<br>Linear programming<br>Optimization methods |
| **Aims of the course** | Understanding optimization techniques |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |

| | | | | |
|---|---|---|---|---|
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | **X** |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

| **Department**<br>Department of Statistics | | | **Date** | | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>İST3103 | **Course Unit Title**<br>Regression | | **Semester/Year**<br>Fall / 3 | **Number of ECTS Credits**<br>5 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | Linear and nonlinear regression models, parameter estimation, model fit, and predictive analysis are examined. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Conditional expected value, regression concept and model building |
| **2** | Creating a simple linear regression model and finding the least squares estimators of the parameters, centralized model |
| **3** | Properties of the least squares estimators of the parameters |
| **4** | Estimating the error variance and examining the properties of the fitted regression line |
| **5** | Estimating the regression parameters and error variance with the maximum likelihood method |
| **6** | Hypothesis testing about the parameters, testing the significance of the regression |
| **7** | Preparing the ANOVA table and explaining how to use it, examining the multiple coefficient of determination |
| **8** | Sample application |
| **9** | Interval estimation about the parameters, interval estimation of the mean response, estimating new observations |
| **10** | Regression lines passing through the origin, examining the model assumptions (residual analysis), examining the heteroscedasticity situation, normal probability plot |
| **11** | Introducing outlier observations and influential observations and examining their effects on the least squares estimators |
| **12** | Creating a multiple regression model, matrix representation and regression Estimation of parameters |
| **13** | Examination of distributional properties of least squares estimators of regression parameters and estimation of error variance |
| **14** | Construction of ANOVA table in multiple regression and hypothesis testing about regression parameters |

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| **Course Resources** | **Montgomery, D. C., Peck, E. A., Vining, G. G. (2001), Introduction to Linear Regression Analysis, 3rd edition, John Wiely & Sons Inc.** |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least | | |

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| | YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | Makes statistical inference (estimation, hypothesis testing, etc.).<br>Produces solutions to problems of different disciplines using statistical techniques.<br>Creates models and performs analysis using statistical package programs.<br>Becomes aware of the interaction between disciplines related to statistics |
| **Aims of the course** | To create the necessary theoretical infrastructure, to be able to analyze the data that may be encountered in the public and private sectors, and to provide the knowledge, skills and practicality to interpret the analysis results. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | X |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |

| | | | | |
|---|---|---|---|---|
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

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|---|---|---|---|---|---|
| **Department**<br>Department of Statistics | | | | **Date** | |
| **Course Unit Code**<br>İST3105 | **Course Unit Title**<br>Multivariate Normal Distribution | | **Semester/Year**<br>Fall / 3 | **Number of ECTS Credits**<br>5 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | Basic properties of the multivariate normal distribution, covariance structure, linear transformations and their applications are covered. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Density function and basic properties of multivariate normal distribution. |
| **2** | Example of two-variate normal distribution. |
| **3** | Variance covariance matrix. |
| **4** | Distribution of quadratic form |
| **5** | Partition of multivariate normal distribution: subvector variables. |
| **6** | Distribution of subvector variables. |
| **7** | Regression equation. |
| **8** | Characteristic function of multivariate normal distribution. |
| **9** | Estimation of parameters. |

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|---|---|
| **10** | Testing the mean vector of random vector variable with multivariate normal distribution. |
| **11** | Hypothesis testing of covariance matrix. |
| **12** | Partition of covariance matrix. |
| **13** | Construction of principal components |
| **14** | Distribution of random vector variable under transformation. |

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|---|---|
| **Course Resources** | **Multivariate Statistical Inference. Narayan C. Giri · 2014, ISBN: 9781483263335, 1483263339** |

| | | | |
|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | |
| **Aims of the course** | Learning the concept of random vector variables. |
| **The way of processing course** | Face to face |

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| **Relation of the course with program outcomes** |

| Learning outcomes | | 1 | 2 | 3 |
|---|---|---|---|---|
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | X |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | **Contribution of the course**: 1:No 2:Partially 3:Completely | | |

| **Department**<br>Department of Statistics | | | **Date** | |
|---|---|---|---|---|
| **Course Unit Code**<br>İST3107 | **Course Unit Title**<br>Probability Problems | **Semester/Year**<br>Fall / 3 | **Number of ECTS Credits**<br>4 | |
| **Language of Instruction** | Turkish | | | |
| **Type of Course Unit** | Optional | | | |
| **Prerequisites and co-requisites** | - | | | |
| **Address of course** | - | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |

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|---|---|---|---|---|---|
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | Fundamental concepts of probability theory, probability distributions, stochastic processes, and their applications to real-world problems are covered. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Series of events and binomial example |
| **2** | Simple random walk. |
| **3** | Gambler's problem. |
| **4** | Sequential dependence and Markov property. |
| **5** | Markov chain with discrete parameters and examples. |
| **6** | Markov chain with two states. |
| **7** | n-step transition probabilities. |
| **8** | Absorption probability. |
| **9** | Classification of states. |
| **10** | Examples of technical systems. |
| **11** | Birth-death process. |
| **12** | Concept of incoming current. |
| **13** | Use of difference equation in a probability problem. |
| **14** | Use of differential equation in a probability problem. |

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| **Course Resources** | Olasılığa Giriş, Alifettah Shahbazov, Birsen Yayınevi. |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least | | |

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| | YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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| **Course Outcome** | Understanding of different solution methods.<br>Reducing the solution of a problem to a probability problem.<br>Understanding the structure of a random variable that depends on a parameter within the series it is connected to.<br>Being able to define a random process axiomatically.<br>Being able to make future predictions at any moment of a random process. |
| **Aims of the course** | Learning the solution techniques of different probability problems. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | **X** |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |

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|---|---|---|---|---|
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

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|---|---|---|---|---|---|
| **Department**<br>Department of Statistics | | | | **Date** | |
| **Course Unit Code**<br>İST3109 | **Course Unit Title**<br>Experimental Design Applications with Package Programs | | **Semester/Year**<br>Fall / 3 | **Number of ECTS Credits**<br>4 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Optional | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | Experimental design methods, analysis of variance and optimization techniques are applied using statistical package programs. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Experimental design and basic concepts |
| **2** | Independent samples design, introduction to JASP and JAMOVI programs and their basic functions |
| **3** | Repeated measures design, Factorial design and interactions |
| **4** | How to do experimental design analyses on JASP and JAMOVI programs |
| **5** | Mixed design and analysis of interactions, Anova and Manova models |
| **6** | How to do mixed design analyses with JASP and JAMOVI programs |

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| **7** | Cross-validation and experimental design optimization, Control groups and balancing in experimental design |
| **8** | How to do cross-validation analyses with JASP and JAMOVI programs |
| **9** | Interpretation and reporting of experimental design data, Ethical issues and experimental design |
| **10** | Visualization of results and reporting techniques with JASP and JAMOVI programs |
| **11** | Semester project |
| **12** | Semester project |
| **13** | Semester project |
| **14** | Semester project |

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| **Course Resources** | Statistical Analysis with JASP: A Guide for Students - Mark Goss-Sampson<br><br>Learning Statistics with Jamovi: A Tutorial for Psychology Students and Other Beginners - Danielle J. Navarro, David R. Foxcroft |

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| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 40 |
| | **Computer Sciences** | 30 |
| | **Programming Design** | 30 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | They will learn about the installation of JASP and Jamovi software and how to use the basic interface.<br>They will be able to load data sets in JASP and Jamovi, perform data cleaning and transformation operations.<br>They will be able to calculate basic statistical summaries of data (mean, median, standard deviation, etc.).<br>They will be able to present data graphically and create different types of graphs (histogram, boxplot, scatterplot, etc.).<br>They will develop their skills in solving statistical problems by practicing on real-world data sets. |
| **Aims of the course** | To develop students' statistical data analysis and visualization skills. This course aims to help students gain the ability to apply statistical methods and analysis, especially using JASP and Jamovi software. Using the user-friendly interfaces of these software, students will be able to perform data analysis easily and effectively. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | X |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| Department<br>Department of Statistics | | | | Date | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>İST3111 | **Course Unit Title**<br>Scale Development | | **Semester/Year**<br>Fall / 3 | **Number of ECTS Credits**<br>4 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Optional | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | Scale development processes, validity and reliability analyses, factor analysis and psychometric tests are examined. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Scale Development and Scale Types |
| **2** | Scale Development Process and Steps, Purposes and Importance of Scale Development |
| **3** | Conceptual Modeling for Scale Development |
| **4** | Approaches Recommended for Scale Development, Concepts of Reliability and Validity |
| **5** | Factor Analysis and Determination of Scale Factor Structure |
| **6** | Item Analysis and Scale Item Selection, Measurement Models in Scale Development Process |
| **7** | Content Validity, Structural Validity and Criterion Validity |
| **8** | Scale Application and Scale Validation, Ethical Issues in Scale Development Process |
| **9** | Statistical Analysis of Scale Development Results |
| **10** | Scale Development Applications and Examples, Interpretation and Reporting of Scale Development Results |
| **11** | Semester Project |
| **12** | Semester Project |
| **13** | Semester Project |
| **14** | Semester Project |

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| **Course Resources** | Scale Development: Theory and Applications - Robert F. DeVellis<br>Handbook of Psychological Testing - Paul Kline |

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| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | |
| **Aims of the course** | To provide students with the knowledge and skills to develop reliable and valid scales to measure psychological, social or educational variables. This course aims to teach the conceptual and methodological steps in the scale development process. Students will learn topics such as writing scale items, conducting pre-tests, validity and reliability analyses, and will be able to design and evaluate their own scales. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |

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|---|---|---|---|---|
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | X |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | **Contribution of the course**: 1:No 2:Partially 3:Completely | |

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|---|---|---|---|---|---|
| **Department**<br>Department of Statistics | | | | **Date** | |
| **Course Unit Code**<br>İST3113 | **Course Unit Title**<br>Life Analysis and Censored Data | | **Semester/Year**<br>Fall / 3 | **Number of ECTS Credits**<br>4 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Optional | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | Survival analysis, methods for working with censored data, hazard functions, and parametric/nonparametric models are covered. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction to Survival Analysis |
| **2** | Life Span Distributions |
| **3** | Continuous Models, Discrete Models |
| **4** | Data Structure |
| **5** | Introduction to Censoring |
| **6** | Survival Curve Comparison Tests |
| **7** | Right Censoring |
| **8** | Right Censoring, Left Censoring |
| **9** | Survival Distributions |
| **10** | Maximum Likelihood Method in Full and Censored Sample Cases |
| **11** | Parameter Estimation for the Weibull Distribution |
| **12** | Parameter Estimation in the Full Sample Case |
| **13** | Parameter Estimation in the Censored (Incomplete) Sample Case |
| **14** | Application |

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| **Course Resources** | Textbooks, online notes, related articles |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. | | |

| | |
|---|---|
| | In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | Understanding survival data, the roles censorship plays, Survival and danger functions Graphs survival data and Kaplan-Meier curve |
| **Aims of the course** | This course includes topics such as; Censored data types, Organization and visualization of survival data, Comparison of survival distributions, Survival regression analysis. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | X |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| Department | | | Date | | |
|---|---|---|---|---|---|
| Department of Statistics | | | | | |
| **Course Unit Code** | **Course Unit Title** | | **Semester/Year** | **Number of ECTS Credits** | |
| İST3115 | Machine Learning | | Fall / 3 | 4 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Optional | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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|---|---|
| **Course content** | Supervised and unsupervised learning algorithms, classification, clustering, deep learning and data mining techniques are examined. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction and Basic Concepts |
| **2** | Introduction to Machine Learning with a Package Program |
| **3** | Data Preprocessing and Basic Statistics |
| **4** | Linear Regression and Performance Evaluation |
| **5** | Logistic Regression and Classification |
| **6** | Decision Trees and Ensembl Methods |
| **7** | Support Vector Machines (SVM) |
| **8** | K-Nearest Neighbor (KNN) and Naive Bayes |
| **9** | Clustering Techniques |
| **10** | Dimensionality Reduction Techniques |
| **11** | Introduction to Neural Networks and Deep Learning |
| **12** | Convolutional Neural Networks (CNN) |
| **13** | Model Evaluation and Hyperparameter Optimization |
| **14** | Student Project Presentations |

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| **Course Resources** | **Introduction to Machine Learning with Python" by Andreas C. Müller and Sarah Guido**<br><br>**"Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow" by Aurélien Géron** |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

| | |
|---|---|
| **Course Outcome** | They will understand machine learning concepts and algorithms.<br>They will be able to develop models using various machine learning algorithms.<br>They will be able to use machine learning packages effectively in various programming languages.<br>They will be able to apply techniques to evaluate and improve model performance.<br>They will be able to develop machine learning solutions for real-world problems. |
| **Aims of the course** | To teach students the basic concepts and algorithms in the field of machine learning and to enable them to put this knowledge into practice using various software packages. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |

| | | | | |
|---|---|---|---|---|
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | X |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |

**Contribution of the course**: 1:No 2:Partially 3:Completely

| | | | | | |
|---|---|---|---|---|---|
| **Department**<br>Department of Statistics | | | **Date** | | |
| **Course Unit Code**<br>IST3117 | **Course Unit Title**<br>Distribution Functions | | **Semester/Year**<br>Fall / 3 | **Number of ECTS Credits**<br>4 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Optional | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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|---|---|
| **Course content** | Probability distribution functions, continuous and discrete distributions, moments and probability density functions are examined. |

## Weekly Detailed Course Contents

| Week | Topic |
|---|---|
| **1** | Calculation of parameters of distribution defined by probability table. |
| **2** | Binomial and distributions defined depending on binomial. |
| **3** | Poisson distribution and binomial approximation to Poisson. |
| **4** | Sum of Bernoulli trials with different parameters. |
| **5** | Convolution formula for discrete distributions. |
| **6** | Exponential distribution. |
| **7** | Convolution formula for exponential distribution and Erlang distribution. |
| **8** | Normal distribution and T distribution. |
| **9** | Square of standard normal: Chi-square distribution. |
| **10** | Ratio of two chi-square distributions: F distribution. |
| **11** | Approximation of binomial to normal distribution. |
| **12** | Central limit theorem and approximation according to distribution. |
| **13** | Law of large numbers. |
| **14** | Applications of strengthened law of large numbers and central limit theorem. |

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| **Course Resources** | **Olasılığa Giriş. A. A. Shahbazov, Birsen yayınevi** |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

| | |
|---|---|
| **Course Outcome** | Defines events that occur with a variable whose distribution is known and calculates probabilities.<br>Tests which distribution a random variable fits.<br>Calculates the distribution parameters of a variable whose indicators are known.<br>Can establish transitions between distributions. |
| **Aims of the course** | Introducing different distribution functions and showing how to use them in practice |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | X |
| **2** | Indicates the place and importance of statistics in professional life. | | X | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| | | |
|---|---|---|
| **Department**<br><br>Department of Statistics | | **Date** |

| Course Unit Code | Course Unit Title | Semester/Year | Number of ECTS Credits |
|---|---|---|---|
| IST3119 | Programming with SAS | Fall / 3 | 4 |

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|---|---|
| **Language of Instruction** | Turkish |
| **Type of Course Unit** | Optional |
| **Prerequisites and co-requisites** | - |
| **Address of course** | - |

| Local Credit | Theoretical | Practical | Laboratory | Presentation | Project |
|---|---|---|---|---|---|
| 3 | 3 | 0 | - | - | - |

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|---|---|
| **Name of Lecturers** | |
| **Assistants** | - |

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| **Course content** | Data analysis, statistical modeling, macro programming and reporting techniques are applied using the SAS programming language. |

| Weekly Detailed Course Contents | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction and Basic Concepts |
| **2** | Data Entry and Working with Data Sets |
| **3** | Data Manipulation and Data Cleaning |
| **4** | Data Transformation and Formatting |
| **5** | Statistical Analysis and Descriptive Statistics |
| **6** | Graphics and Data Visualization |
| **7** | Sample Applications |
| **8** | Macro Variables and Macro Programming |
| **9** | Advanced Data Manipulation Techniques |
| **10** | Advanced Statistical Analysis |
| **11** | Data Mining and Forecasting Models |
| **12** | Data Management and Working with Databases |
| **13** | Project Studies and Case Studies |
| **14** | Student Project Presentations |

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| **Course Resources** | **The Little SAS Book: A Primer" - Lora D. Delwiche, Susan J. Slaughter**<br>**"SAS Certification Prep Guide: Base Programming for SAS 9" - SAS Institute** |

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| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |

| | | | |
|---|---|---|---|
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 40 |
| | **Computer Sciences** | 30 |
| | **Programming Design** | 30 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | To be able to explain the basic concepts and uses of SAS.<br>To be able to create SAS data sets and use data entry methods.<br>To be able to perform data cleaning and transformation operations using basic SAS functions.<br>To be able to perform basic statistical analyses.<br>To be able to perform advanced statistical analyses. |
| **Aims of the course** | It aims to teach students the basic and advanced concepts of SAS programming, data management and analysis techniques. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |

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|---|---|---|---|---|
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | **X** |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | **Contribution of the course**: 1:No 2:Partially 3:Completely | |

| **Department**<br>Department of Statistics | | | **Date** | | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>YMH3121 | **Course Unit Title**<br>Web Design and Programming | | **Semester/Year**<br>Fall / 3 | **Number of ECTS Credits**<br>3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Optional | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | HTML, CSS, JavaScript and dynamic web application development techniques and user experience design are covered. |

| Weekly Detailed Course Contents | |
|---|---|
| **Week** | **Topic** |
| **1** | Internet, Intranet, Internet services and protocols, Web page hierarchical organization, format, page transitions, target audience, scope, quality, color harmony, placement, interaction, document preparation, animated text and images |
| **2** | HTML introduction, Web editor, links, text and line types, frames, tables, lists. |
| **3** | HTML forms, buttons and menus, placement of visual elements |
| **4** | Using CSS in HTML pages |
| **5** | HTML 5.0 structure and features |
| **6** | Javascript and JQuery basics, writing client-side and server-side scripts |
| **7** | Creating dynamic content with Javascript and JQuery |
| **8** | ASP.NET basics; web forms, code development, validation and rich controls |
| **9** | Creating templates using Master Page in ASP.NET |
| **10** | ASP.NET objects (Reponse, Request) |
| **11** | ASP.NET objects (Session, Application, Server) |
| **12** | Reading and writing files with ASP.Net |
| **13** | Database applications in ASP.NET |
| **14** | XML applications in ASP.NET |

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| **Course Resources** | **C# ile Asp.net 4.0, Zafer Demirkol, Kodlab 2011.**<br><br>**Learning Web Design: A Beginner's Guide to (X)HTML, StyleSheets, and Web Graphics, Jennifer Niederst Robbins , O'Reilly Media,2007.** |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who | | |

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|---|---|
| | has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 40 |
| | **Computer Sciences** | 30 |
| | **Programming Design** | 30 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | Knows the basic concepts of Internet Programming and dynamic web programming structure.<br>Knows simple input-output operations, loop and decision-making structures.<br>Students are provided with information on how to use web development tools effectively, database management, security awareness and advanced web technology applications.<br>Through the information provided in the program, students are provided with a strong foundation in web design and coding in their professional practices. |
| **Aims of the course** | The aim of the course is to teach the most widely used Web technologies today with sample projects. For this purpose, Internet, Intranet, Internet services and protocols. Image, graphic, animation, sound, image development software. Web page hierarchical organization, format, page transitions, target audience, scope, quality, color harmony, placement, interaction, document preparation, animated text and pictures. ASP.NET Basics Web editor, frames, tables, lists, forms, placement of visual elements, , links, text and line types, buttons and menus. Web area selection; domain name, quality, capacity, Internet service providers, database and web programming support, e-mail limit and cost. File transfer protocol and software, Internet service provider connection, web page loading and updating topics will be covered. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | **X** |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |

| | | | | |
|---|---|---|---|---|
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

| | | | | | |
|---|---|---|---|---|---|
| **Department**<br>Department of Statistics | | | | **Date** | |
| **Course Unit Code**<br>IKT3123 | **Course Unit Title**<br>Turkish Economy | | **Semester/Year**<br>Fall / 3 | **Number of ECTS Credits**<br>3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Optional | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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|---|---|
| **Course content** | The historical development of the Turkish economy, sector analysis, macroeconomic indicators and current economic policies are examined. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction |
| **2** | Economic structure before the Republic |
| **3** | 1923-1929: The founding years of the Republic |
| **4** | 1930-1939: The period of statism |
| **5** | 1940-1949: The years of World War II and after |

| | |
|---|---|
| **6** | 1950-1960 First half of the Period: Liberal economy period |
| **7** | 2002nd half of the Period: Return to protectionist policies in foreign trade |
| **8** | 1960-1980: Planned development period |
| **9** | 1980-1989: The process of structural change towards the export-oriented industrialization model and market economy |
| **10** | 1990s: The process of liberalization of capital movements and conjunctural policies |
| **11** | 2000s: The goals and policies of the stand-by program in the period of 2000-2002 |
| **12** | 2000s: Economic crises of November 2000 and February 2001 |
| **13** | 2002 onwards: Economic policies of the period after the single-party government |
| **14** | 2008 global The economic effects of the crisis and the Covid-19 pandemic process |

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|---|---|
| **Course Resources** | İlker Parasız, Türkiye Ekonomisi, Ezgi Yayınevi |

| | | | |
|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 30 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 70 |

| | |
|---|---|
| **Course Outcome** | Understanding that it is not possible to evaluate independently of the economic, political and social fields |

| | |
|---|---|
| | Understanding the relationships between the ruptures seen in Turkey's economic policies and the paradigm changes experienced in the world<br>Understanding the important changes that have occurred in Turkey's economic structure in terms of periods<br>Being able to monitor the changes in Turkey's industrial strategy, development model, foreign trade regime and exchange rate system in periods<br>Being able to make evaluations on Turkey's historical and current economic problems |
| **Aims of the course** | The main purpose of the course is to make a comprehensive evaluation of the Turkish Economy over time, without separating it from its historical context and taking into account the political/ideological conjuncture changes. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | X |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| **Department**<br>Department of Statistics | | | **Date** | | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>ISG3125 | **Course Unit Title**<br>Occupational Health and Safety | | **Semester/Year**<br>Fall / 3 | **Number of ECTS Credits**<br>3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Optional | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

| **Course content** | Occupational health and safety management systems, risk assessment methods and occupational safety legislation are discussed. |
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| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Purpose, Scope, Definitions of Occupational Health and Safety |
| **2** | OHS Law No. 6331 and Employer's Obligations |
| **3** | OHS Law No. 6331 and Employer's Obligations |
| **4** | Labor Law No. 4857 and Employer's Obligations |
| **5** | Social Insurance and General Health Insurance Law No. 5510 and Employer's Obligations |
| **6** | Workplace Risks and Work Accidents |
| **7** | Duties, Authorities and Responsibilities of Joint Health and Safety Units |
| **8** | Duties, Authorities and Responsibilities of Workplace Health and Safety Units |
| **9** | Determination of Workplace Hazard Classes |
| **10** | Duties, Authorities, Responsibilities and Trainings of Occupational Safety Specialists |
| **11** | Duties, Authorities, Responsibilities and Trainings of Workplace Physicians and Other Health Personnel |
| **12** | Use of Personal Protective Equipment in Workplaces |
| **13** | Occupational Health and Safety Services to be Conducted by the Employer or Employer's Representative in Workplaces |
| **14** | Occupational Health of Employees And Security Trainings |

| **Course Resources** | 6331 Sayılı İş Sağlığı ve Güvenliği Kanunu, 4857 Sayılı İş Kanunu, 5510 Sayılı SSGSS Kanun |
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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 30 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 70 |

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|---|---|
| **Course Outcome** | Gains related to OHS Law, Regulation and Legislation<br>Historical process of OHS in the world and in Turkey, Evaluation of OHS Risks, Responsibilities of the state, employer and employee<br>Gaining the ability to communicate effectively with professional and ethical responsibility awareness<br>Increasing the knowledge related to OHS Regulation and Legislation |
| **Aims of the course** | To inform employers and employees about their duties, authorities, responsibilities, rights and obligations in order to ensure occupational health and safety in workplaces and to improve current health and safety conditions. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |

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|---|---|---|---|---|
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | X |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | **Contribution of the course**: 1:No 2:Partially 3:Completely | |

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|---|---|---|---|---|---|
| **Department**<br>Department of Statistics | | | | **Date** | |
| **Course Unit Code**<br>YMH3127 | **Course Unit Title**<br>Data Mining | | **Semester/Year**<br>Fall / 3 | **Number of ECTS Credits**<br>3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Optional | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | Big data analysis, data mining algorithms, classification, clustering and pattern recognition techniques are covered. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Data Warehousing |
| **2** | Data Mining |
| **3** | Classification with Decision Tree ID3 |
| **4** | Classification with Decision Tree C4.5 |
| **5** | Classification and Regression Trees Twoing Algorithm |
| **6** | Classification and Regression Trees Gini Algorithm |
| **7** | Memory Based Classification |
| **8** | KNN |
| **9** | Clustering K-Means Algorithm |
| **10** | Clustering Hierarchical Clustering |
| **11** | Association Rule |
| **12** | Association Rule Apriori Algorithm |
| **13** | Bayesian Classifier |
| **14** | Artificial Neural Networks |

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| **Course Resources** | **Jiawei Han and Micheline Kamber, Data Mining Concepts and Techniques, Morgan Kauffman. Margareth H. Dunham, Data Mining Introductory and Advanced Topics, Prentice Hall, Pearson Education.** |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who | | |

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| | has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 40 |
| | **Computer Sciences** | 30 |
| | **Programming Design** | 30 |
| | **Social Sciences** | 0 |

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| **Course Outcome** | Understanding the basic concepts, processes and application areas of data mining.<br>Ability to apply data cleaning, integration, transformation and reduction techniques.<br>Analyzing data and extracting meaningful information with data discovery and data visualization techniques.<br>Ability to follow current trends, technologies and research in the field of data mining. |
| **Aims of the course** | This course provides information about the methods and algorithms used during the collection, storage and analysis of data. It contains detailed information about the methods used in the literature and their application areas. Within the scope of the algorithms explained in the course, the effective use of the taught algorithms is measured with the requested project assignments. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | X |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |

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| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

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|---|---|---|---|---|---|
| **Department**<br>Department of Statistics | | | | **Date** | |
| **Course Unit Code**<br>YBS3129 | **Course Unit Title**<br>Electronic Commerce and Electronic Business | | **Semester/Year**<br>Fall / 3 | **Number of ECTS Credits**<br>3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Optional | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | Digital marketing, e-commerce infrastructures, online payment systems and electronic transformation processes for businesses are discussed. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction and Basic Concepts |
| **2** | E-Commerce Business Models |
| **3** | E-Commerce Infrastructure and Technologies |
| **4** | Digital Payment Systems |
| **5** | E-Commerce Marketing Strategies |
| **6** | E-Commerce Analytics and Data Management |
| **7** | Data Analysis and Reporting |
| **8** | E-Business Strategies and Business Models |
| **9** | Customer Relationship Management (CRM) and E-Business |
| **10** | Logistics and Supply Chain Management |
| **11** | Legal and Ethical Issues |

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|---|---|
| **12** | International E-Commerce |
| **13** | Future E-Commerce Trends |
| **14** | Student Project Presentation |

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| **Course Resources** | **"E-Commerce 2019: Business, Technology, and Society" - Kenneth C. Laudon, Carol Guercio Traver**<br><br>**"Digital Business and E-commerce Management" - Dave Chaffey** |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 30 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 70 |

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|---|---|
| **Course Outcome** | Define the concepts of e-commerce and e-business.<br>Identify the technologies and tools required for e-commerce infrastructure.<br>Explain the importance of logistics and supply chain management in e-commerce.<br>Explain the basic concepts of international e-commerce.<br>Gain hands-on experience by working on real-world e-commerce projects. |

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| **Aims of the course** | It aims to teach students the basic principles, technological infrastructure, business models and strategies of e-commerce and e-business. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | **X** |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| **Department** | | | **Date** |
|---|---|---|---|
| Department of Statistics | | | |
| **Course Unit Code** | **Course Unit Title** | **Semester/Year** | **Number of ECTS Credits** |
| MAT3137 | Numerical Analysis | Fall / 3 | 3 |
| **Language of Instruction** | Turkish | | |
| **Type of Course Unit** | Optional | | |
| **Prerequisites and co-requisites** | - | | |

| Address of course | - | | | | |
|---|---|---|---|---|---|
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

| **Course content** | Numerical methods, numerical differentiation and integration, applications of linear algebra, and numerical optimization techniques are covered. |
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| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Taylor expansion. |
| **2** | Newton's method of successive calculations. |
| **3** | Construction of polynomial with known fixed points. |
| **4** | Divided difference method |
| **5** | Approximate calculation of the root of the equation. |
| **6** | Solution of linear equation systems and Kramer system. |
| **7** | Least square method. |
| **8** | Big data problem: matrix decomposition. |
| **9** | Principal components. |
| **10** | Partial least square method. |
| **11** | Numerical differentiation. |
| **12** | Numerical integration, Stieltjes integral |
| **13** | Approximate calculation of factorial. |
| **14** | Markov inequality and its applications. |

| **Course Resources** | **Numerical Anaysis. Rainer Kress, Springer. ISBN: 9781461205999, 1461205999** |
|---|---|

| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
|---|---|---|---|
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |

| | |
|---|---|
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | Can calculate the solution of an equation approximately.<br>Can solve a problem that is converted to a regression model. |
| **Aims of the course** | To be able to design appropriate solutions for problems that do not have a definitive solution |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | X |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |

| | | | | |
|---|---|---|---|---|
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

**SEMESTER 6**

| **Department**<br>Department of Statistics | | | **Date** | | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>IST3102 | **Course Unit Title**<br>Operations | | **Semester/Year**<br>Spirng / 3 | **Number of ECTS Credits**<br>6 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 4 | 4 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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|---|---|
| **Course content** | Decision making processes, optimization techniques, linear programming and simulation methods are covered. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Structure of decision problems, problem definition and model building |
| **2** | Introduction to linear programming and its solution with graphical method |
| **3** | Solution of linear programming problems with simplex method |
| **4** | Performing duality and sensitivity analysis after optimum solution |
| **5** | Computer application (Solution of linear programming problems and sensitivity analysis) |
| **6** | Integer programming and Gomory cutting plane algorithm |
| **7** | Sample applications |
| **8** | Transportation models and solution algorithms |

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|---|---|
| **9** | Assignment models and solution algorithms |
| **10** | Transportation models and solution algorithms |
| **11** | Network analysis; creation and solution of network models |
| **12** | Network analysis; CPM method |
| **13** | Network analysis; PERT method |
| **14** | Cost-time relationship in project planning and acceleration of the project |

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| **Course Resources** | **Frederick S. Hiller, Gerald J. Lieberman - Yöneylem Araştırmasına Giriş Ahmet Öztürk - Yöneylem Araştırmasına Giriş** |

| | | | |
|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

| | |
|---|---|
| **Course Outcome** | Explains operations research techniques.<br>Produces a mathematical model of quantitative problems encountered in social sciences using operations research methods.<br>Solves modeled problems.<br>Solves operations research problems with package programs.<br>Interprets the obtained solutions. |

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| **Aims of the course** | To provide the necessary qualifications for mathematical modeling and solution of relevant problems using the taught techniques. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | **X** |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| **Department** | | | **Date** |
|---|---|---|---|
| Department of Statistics | | | |
| **Course Unit Code** | **Course Unit Title** | **Semester/Year** | **Number of ECTS Credits** |
| IST3104 | Prediction Theory | Spirng / 3 | 5 |

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|---|---|---|---|---|---|
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | Statistical estimation methods, parameter estimation, bayesian approaches and forecasting techniques are examined. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Basic concepts related to sampling theory |
| **2** | Distribution of the sampling mean |
| **3** | Distribution of the sampling mean and interval estimation |
| **4** | Point estimation |
| **5** | Best estimators and their properties |
| **6** | Adequate statistics |
| **7** | Point estimation methods |
| **8** | Interval estimation for the difference between population means |
| **9** | Distribution of the sampling variance and interval estimation |
| **10** | Sampling distribution and interval estimation for two variance ratios |
| **11** | Sampling distribution and interval estimation for the difference between two ratios |
| **12** | Maximum likelihood method |
| **13** | Least squares method |
| **14** | Least squares estimators |

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| **Course Resources** | **İstatistiksel Tahmin Teorisi (Süleyman Yavuz, Özge Akkuş Gazi Kitabevi (2016))** |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |

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|---|---|---|---|
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | Understanding of Sampling Method<br>Estimating Population Parameters<br>Estimating Distribution Parameters<br>Determines confidence intervals in estimation, examines the goodness of fit of the model, performs hypothesis tests<br>Understanding of the Least Squares method |
| **Aims of the course** | Introduction of Parameter Estimation Methods in Statistical Models |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |

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|---|---|---|---|---|
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | X |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

| **Department**<br>Department of Statistics | | | **Date** | | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>IST3106 | **Course Unit Title**<br>Multivariate Statistical Analysis | | **Semester/Year**<br>Spirng / 3 | **Number of ECTS Credits**<br>5 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | Multivariate data analysis, principal components analysis, discriminant analysis and factor analysis methods are covered. |

| Weekly Detailed Course Contents | |
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| **Week** | **Topic** |
| **1** | Principal Components Analysis, Necessity of principal components analysis, obtaining principal components. |
| **2** | Characteristics of principal components, determination of the number of principal components. |
| **3** | Factor Analysis, Purpose of factor analysis, similarity with principal components analysis. |
| **4** | Principal factor method, factor rotation and conceptual significance. |
| **5** | Principal components analysis and factor analysis with the help of relevant package programs. |
| **6** | Canonical Correlation: Concept of relationship and purpose of analysis, obtaining canonical correlations. |
| **7** | Significance checks and applications of canonical correlation coefficients. |
| **8** | Introduction to Discriminant Analysis:, Discriminant analysis in case of two groups. |
| **9** | Discriminant analysis and applications in case of more than two groups. |
| **10** | Similarity and distance measures. |
| **11** | Cluster Analysis and methods. |
| **12** | Use of package programs related to Cluster Analysis. |
| **13** | Multidimensional scaling methods. |
| **14** | Comparison of multidimensional scaling methods. |

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| **Course Resources** | **Alvin C. Rencher. Methods of Multivariate Analysis (2nd Edition) Wiley series in probability and mathematical statistics** |

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| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. | | |

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| | In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 50 |
| | **Computer Sciences** | 50 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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| **Course Outcome** | Determines the structure of data formed by a large number of variables.<br>Converts the structure of data formed by a large number of variables into a form as simple as possible.<br>Uses multidimensional scaling methods.<br>Decides which analysis is appropriate for multivariate data and can use the relevant packages. |
| **Aims of the course** | The aim of this course is to determine the structure of the data created by many variables and to transform it into a simple form, to decide which analysis will be appropriate to use, to comment on the relevant subject and to reach the right decision. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | X |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| Department<br>Department of Statistics | | | | Date | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>IST3108 | **Course Unit Title**<br>Experimental Probability | | **Semester/Year**<br>Spring / 3 | **Number of ECTS Credits**<br>4 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Optional | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

| **Course content** | The concept of experimental probability, simulation techniques, Monte Carlo methods and applied probability analysis are covered. |
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| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Concept of trust and risk. Definition of trust region as probability. |
| **2** | Conditional probability and Bayes theorem. |
| **3** | Classical frequentist approach and Bayes approach. |
| **4** | Concept of prior and posterior distribution. |
| **5** | Beta distribution and its properties. |
| **6** | Bayesian estimation method. |
| **7** | Goodness of fit tests for experimental distributions: Chi-Square test. |
| **8** | Goodness of fit tests for experimental distributions: Kolmogorov-Simirnov test. |
| **9** | Convolution formula. |
| **10** | Numerical characteristics of random variables. |
| **11** | Covariance and correlation. |
| **12** | Techniques of generating data from distribution. |
| **13** | Simulation logic. |
| **14** | Simulation scenario. |

| **Course Resources** | **Olasılığa Giriş, Alifettah Shahbazov, Birsen Yayınevi** |
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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 50 |
| | **Computer Sciences** | 50 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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| **Course Outcome** | It obtains more information by matching data with theoretical structures.<br>It increases the information obtained when a structured experiment is performed.<br>It can reveal the relationships between events.<br>It can produce data whose distribution it knows.<br>It can construct a simulation. |
| **Aims of the course** | Finding the equivalents of experimental data in theoretical structures |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | X |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |

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|---|---|---|---|---|
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

| **Department**<br>Department of Statistics | | | **Date** | | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>İST3110 | **Course Unit Title**<br>Distribution Functions of Two Variables | | **Semester/Year**<br>Spring / 3 | **Number of ECTS Credits**<br>4 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Optional | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |

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| **Assistants** | - |

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| **Course content** | Joint distribution functions, covariance, dependence structures and bivariate statistical analysis methods are covered. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Joint probability table and conditional probability calculation. |
| **2** | Joint distribution of two variables with binomial and geometric distribution. |
| **3** | Two-variable normal distribution. Covariance matrix. |
| **4** | Two-variable exponential distribution. |
| **5** | Copula and its examples. |
| **6** | Conditional expected value and conditional variance. |
| **7** | Covariance function depending on the index in random variable series. |
| **8** | Conditional distribution. |
| **9** | Product moment and independence. |
| **10** | Finding the joint distribution of variables with known marginals. |
| **11** | Two-variable gamma distribution. |
| **12** | Two-variable logistic distribution. |
| **13** | Parametric regression model. |
| **14** | Parameter estimation in two-variable distribution. |

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| **Course Resources** | **Univariate Discrete Distributions. Norman L. Johnson v.d. 2005, ISBN: 9780471272465, 0471272469** |

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| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the | | |

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| | instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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| **Course Outcome** | Understanding the concepts of independence and unrelatedness.<br>Understanding the methods used in multivariate statistical analysis.<br>Understanding the measures of relationship. |
| **Aims of the course** | To provide the basis for multivariate statistical analyses |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | X |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| **Department**<br>Department of Statistics | | | **Date** | | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>IST3112 | **Course Unit Title**<br>Quality Assurance and Standards | | **Semester/Year**<br>Spring / 3 | **Number of ECTS Credits**<br>4 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Optional | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

| **Course content** | Quality control methods, ISO standards, total quality management (TQM) and process improvement techniques are examined. |
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| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Development Process of Standardization, Definition |
| **2** | Occupational Health and Safety Provisions |
| **3** | Subject, Objectives and Principles of Standardization |
| **4** | Benefits of Standardization to Manufacturers, Consumers and Economy |
| **5** | Turkish Standards Institute and Its Duties Types of Certification in Turkey |
| **6** | Regional and International Standardization Organizations National and International Metrology Calibration Studies |
| **7** | Definition of Quality, Concepts Related to Quality Relationships Between Concepts Related to Quality |
| **8** | Quality Approaches |
| **9** | Relations Between Quality and Productivity Quality Costs and Risks |
| **10** | Benefits of Quality Assurance |
| **11** | Total Quality Management |
| **12** | Quality Management System |
| **13** | ISO 9000 Standards Other Standards |
| **14** | ISO 9000 Standards Other Standards |

| **Course Resources** | Lecture Notes |
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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 50 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 50 |

| | |
|---|---|
| **Course Outcome** | Basic information about standardization,<br>Necessity and importance of standardization,<br>Importance of quality assurance,<br>Implementing quality standards,<br>Occupational standards. |
| **Aims of the course** | The easiest way to achieve the desired international standardization is to establish and implement an appropriate quality assurance system in the business. The aim is to provide the student with skills related to quality assurance and standards in business life. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |

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|---|---|---|---|---|
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | X |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | **Contribution of the course**: 1:No 2:Partially 3:Completely | |

| **Department**<br>Department of Statistics | | | **Date** | |
|---|---|---|---|---|
| **Course Unit Code**<br>IST3114 | **Course Unit Title**<br>Statistical Randomness Tests | **Semester/Year**<br>Spring / 3 | **Number of ECTS Credits**<br>4 | |
| **Language of Instruction** | Turkish | | | |
| **Type of Course Unit** | Optional | | | |
| **Prerequisites and co-requisites** | - | | | |
| **Address of course** | - | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |

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| **Assistants** | - |

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| **Course content** | Randomness tests, hypothesis tests, permutation and simulation-based randomness measures are covered. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | What is Cryptology? |
| **2** | Cryptographic applications |
| **3** | Encryption Algorithms |
| **4** | Randomness |
| **5** | Random Number Generators |
| **6** | Frequency (Monobits) test |
| **7** | Frequency test within a block |
| **8** | Runs test |
| **9** | Longest ones test in a block |
| **10** | Binary matrix rank test |
| **11** | Discrete fourier transform (Spectral) test. |
| **12** | Strategies for Statistical Analysis of an RNG |
| **13** | Alternative Stat. Tests and Test Suites |
| **14** | Alternative Stat. Tests and Test Suites |

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| **Course Resources** | Textbooks, online notes, related articles |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who | | |

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| | has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 40 |
| | **Computer Sciences** | 30 |
| | **Programming Design** | 30 |
| | **Social Sciences** | 0 |

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| **Course Outcome** | You will learn about randomness.<br>You will have an idea of why and how random numbers are generated.<br>You will learn how to test whether the random numbers obtained are truly random. |
| **Aims of the course** | The aim of this course is to learn the concepts of random number generators, randomness tests, random number generation appropriate to distributions, and data generation appropriate to statistical models. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | X |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| Department<br>Department of Statistics | | | | Date | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>İST3116 | **Course Unit Title**<br>R Programming | | **Semester/Year**<br>Spring / 3 | **Number of ECTS Credits**<br>4 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Optional | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

| **Course content** | Data analysis, statistical modeling, data visualization and machine learning applications are performed using the R programming language. |
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| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction to R Programming |
| **2** | Data Structures and Functions |
| **3** | Data Manipulation |
| **4** | Data Visualization - I |
| **5** | Data Visualization - II |
| **6** | Reading and Writing Data |
| **7** | Statistical Analysis - I |
| **8** | Statistical Analysis - II |
| **9** | Reporting and Documentation |
| **10** | Data Mining and Machine Learning |
| **11** | Application: Project Start |
| **12** | Student Project Development |
| **13** | Student gain the ability to understand and use basic data structures and functions using the R programming language. Project Development |
| **14** | Student Project Presentation |

| **Course Resources** | **Arslan, İ. (2015). R ile istatistiksel programlama. Pusula.** |
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| | *Özkan, B., & Özkan, Y. (2017). R ile Programlama, 1. Papatya Yayıncılık Eğitim, İstanbul, Türkiye.* |

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| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 50 |
| | **Computer Sciences** | 30 |
| | **Programming Design** | 30 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | Gaining the ability to understand and use basic data structures and functions using the R programming language.<br>Gaining the ability to understand basic statistical concepts and perform statistical analysis using R.<br>Learning and applying the basics of data mining and machine learning.<br>Gaining the ability to develop and present projects by analyzing real-world data sets. |
| **Aims of the course** | It aims to provide students with data analysis and visualization skills using the R programming language. It is aimed that students will gain the ability to manipulate real-world data sets, perform statistical analysis and visualize results effectively by developing basic R programming skills. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** |
|---|

| Learning outcomes | | 1 | 2 | 3 |
|---|---|---|---|---|
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | X |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| **Department**<br>Department of Statistics | | | **Date** |
|---|---|---|---|
| **Course Unit Code**<br>İST3118 | **Course Unit Title**<br>Data Analysis in Repeated Measurements | **Semester/Year**<br>Spring / 3 | **Number of ECTS Credits**<br>4 |
| **Language of Instruction** | Turkish | | |
| **Type of Course Unit** | Optional | | |
| **Prerequisites and co-requisites** | - | | |

| Address of course | - | | | | |
|---|---|---|---|---|---|
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

| **Course content** | Statistical methods for repeated measures data, analysis of variance, mixed effects models, and longitudinal data analysis are examined. |
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| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction to Data Analysis in Repeated Measures |
| **2** | Planning a Repeated Measures Design |
| **3** | Analysis of Variance (ANOVA) Basics |
| **4** | Application of ANOVA in Repeated Measures - I |
| **5** | Application of ANOVA in Repeated Measures - II |
| **6** | Modeling Responses in Repeated Measures - I |
| **7** | Modeling Responses in Repeated Measures - II |
| **8** | Modeling Responses in Repeated Measures - III |
| **9** | Modeling Responses in Repeated Measures - IV |
| **10** | Modeling Responses in Repeated Measures - V |
| **11** | Application and Project |
| **12** | Application and Project |
| **13** | Student Project Presentation |
| **14** | Student Project Presentation |

| **Course Resources** | **"Applied Multivariate Statistical Analysis" by Richard A. Johnson and Dean W. Wichern**<br>***"Statistical Methods for the Analysis of Repeated Measurements" by Charles S. Davis*** |
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| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
|---|---|---|---|
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |

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|---|---|---|---|
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 50 |
| | **Computer Sciences** | 30 |
| | **Programming Design** | 30 |
| | **Social Sciences** | 0 |

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| **Course Outcome** | Understanding the definition and importance of repeated measures data.<br>Learning basic statistical concepts and methods related to repeated measures.<br>Creating and evaluating complex models.<br>Performing repeated measures analysis on real data sets and reporting findings.<br>Performing repeated measures data analysis using statistical analysis software (R, SPSS, SAS, etc.). |
| **Aims of the course** | The aim is to teach the basic principles of repeated measures designs, analysis methods and the correct interpretation of these analyses. Students will be able to identify problems they may encounter when working with repeated measures data, select appropriate analysis techniques and apply these techniques to effectively interpret the results. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| | Learning outcomes | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | X |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |

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|---|---|---|---|---|
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

| **Department**<br>Department of Statistics | | | **Date** | | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>IST3120 | **Course Unit Title**<br>Order Statistics | | **Semester/Year**<br>Spring / 3 | **Number of ECTS Credits**<br>4 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Optional | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | Basic concepts of order statistics, distributions of order statistics, and rank-based tests are covered. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Basic concepts of probability, discrete, continuous and mixed distributions |
| **2** | Estimation, Experimental Distribution Function, Hypothesis Testing, Confidence Interval, Likelihood |

| | |
|---|---|
| | Function |
| **3** | Distribution of Order Statistics, Joint Distribution Function of Two Order Statistics, Conditional Distribution Functions of Order Statistics |
| **4** | Some Properties of Order Statistics, Distributions of Median and Some Other Statistics |
| **5** | Marginal Distribution of Discrete Order Statistics, Joint Distribution of Discrete Order Statistics |
| **6** | Dependency Structure, Range in Distribution |
| **7** | Geometric Order Statistics, Order Statistics obtained from samples drawn without replacement |
| **8** | Order Statistics from Bernoulli, Binomial Distribution |
| **9** | Order Statistics from Poisson Distribution |
| **10** | Order Statistics from Exponential and Uniform Distribution |
| **11** | Order Statistics from Logistic and Normal Distribution |
| **12** | Order Statistics Data Types, Order Statistics and Adequacy |
| **13** | Maximum Likelihood Estimation, Linear Estimation of Location and Shape Parameters |
| **14** | Estimation of Order Statistics, Distribution-Independent Confidence and Tolerance Intervals, Goodness of Fit Tests |

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| **Course Resources** | Textbooks, online notes, related articles |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| | **Mathematics and Basic Sciences** | 100 |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | To be able to obtain probability distributions for order statistics<br>To be able to understand the dependency structures of order statistics<br>To be able to classify order statistics data according to their different characteristics<br>To be able to understand how order statistics are used in estimation, hypothesis testing and goodness of fit tests<br>To be able to demonstrate the ability to solve problems related to order statistics |
| **Aims of the course** | In this course, students will learn the theoretical and conceptual aspects of order statistics. The course will teach the theoretical background of order statistics and provide practice with order statistics data. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | X |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| Department | | | Date | | |
|---|---|---|---|---|---|
| Department of Statistics | | | | | |
| **Course Unit Code** | **Course Unit Title** | | **Semester/Year** | **Number of ECTS Credits** | |
| YMH3122 | Data Processing | | Spring / 3 | 3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Optional | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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|---|---|
| **Course content** | Data cleaning, transformation, missing data management, and big data processing techniques are covered. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction and Basic Concepts |
| **2** | Data Collection and Entry |
| **3** | Data Cleaning |
| **4** | Data Transformation |
| **5** | Data Visualization |
| **6** | Exploratory Data Analysis (EDA) |
| **7** | Applications with R and Python |
| **8** | Advanced Data Cleaning Techniques |
| **9** | Time Series Data Processing |
| **10** | Text Data Processing |
| **11** | Data Integration and Data Quality |
| **12** | Big Data Processing |
| **13** | Data Processing Projects and Applications |
| **14** | Student Project Work with R and Python |

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| **Course Resources** | Data Science for Business" - Foster Provost, Tom Fawcett<br>"Python for Data Analysis" - Wes McKinney<br>"R for Data Science" - Hadley Wickham, Garrett Grolemund |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 40 |
| | **Computer Sciences** | 30 |
| | **Programming Design** | 30 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | To be able to explain the general structure of the data processing process<br>To be able to define various data collection techniques.<br>To be able to read and import data from different data sources.<br>To be able to explain the importance of data visualization.<br>To be able to develop application skills by doing project work with R and Python |
| **Aims of the course** | It aims to teach students data processing processes and techniques, data cleaning, transformation, analysis and visualization methods. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |

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|---|---|---|---|---|
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | X |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | **Contribution of the course**: 1:No 2:Partially 3:Completely | |

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|---|---|---|---|---|---|
| **Department**<br>Department of Statistics | | | | **Date** | |
| **Course Unit Code**<br>YBS3124 | **Course Unit Title**<br>Decision Support Systems for Businesses | | **Semester/Year**<br>Spring / 3 | **Number of ECTS Credits**<br>3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Optional | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |

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| **Name of Lecturers** | |
| **Assistants** | - |

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| **Course content** | Decision support systems, data analytics, optimization and artificial intelligence-based decision mechanisms in businesses are examined. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction and Basic Concepts |
| **2** | Decision Making Process and Models |
| **3** | Data Management and Data Warehouses |
| **4** | Business Intelligence and Analytics |
| **5** | Modeling and Simulation |
| **6** | Optimization and Decision Support |
| **7** | KDS Software and Applications |
| **8** | Comparison of KDS software |
| **9** | Big Data and KDS |
| **10** | Cloud Computing and KDS |
| **11** | Artificial Intelligence and Decision Support Systems |
| **12** | Case Studies and Applications |
| **13** | Project Studies and Presentations |
| **14** | Student Project Presentations |

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| **Course Resources** | **Decision Support Systems: Concepts and Resources for Managers" by Daniel J. Power**<br>**Decision Support and Business Intelligence Systems" by Efraim Turban et al.** |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be | | |

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| | evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 50 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 50 |

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| **Course Outcome** | To be able to explain the definition and importance of decision support systems (DSS).<br>To be able to define the role and usage areas of DDS in businesses.<br>To be able to explain the stages of the decision-making process and the role of DDS in this process.<br>To be able to understand how DDS is integrated into the decision-making process.<br>To be able to understand the technologies and tools used in data management. |
| **Aims of the course** | It aims to teach students the basic concepts of DSS, its application areas and how to use it in businesses. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | X |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |

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| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

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|---|---|---|---|---|---|
| **Department**<br>Department of Statistics | | | | **Date** | |
| **Course Unit Code**<br>İSG3126 | **Course Unit Title**<br>Disaster and Emergency Management | | **Semester/Year**<br>Spring / 3 | **Number of ECTS Credits**<br>3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Optional | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | Disaster risk analysis, crisis management, emergency planning and post-disaster recovery processes are examined. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Emergency Management |
| **2** | Disaster and Emergency Risk and Disaster Risk Management |
| **3** | AFAD Organization and Duties |
| **4** | AFAD Organization and Duties |
| **5** | Disaster and Emergency Response Services |
| **6** | Disaster and Emergency Response Services |
| **7** | Emergencies in Workplaces and Precautions to be Taken |
| **8** | Emergencies in Workplaces and Evacuation Plans |
| **9** | Fire Protection of Buildings and Action Plan |
| **10** | Operator's Obligations for Preventing Major Industrial Accidents |
| **11** | Emergency Action Plan for Preventing Major Industrial Accidents |

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|---|---|
| **12** | Preparation of Emergency Plan |
| **13** | Determination of Emergency Response Methods |
| **14** | Determination of Evacuation Methods |

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| **Course Resources** | 6331 Sayılı İş Sağlığı ve Güvenliği Kanunu, İSG Genel Müdürlüğü Acil Durum Planı Hazırlama Rehberi, Acil Durum Yönetimi, İşyerlerinde Acil Durumlar Hakkında Yönetmelik ve Ders Notları |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 30 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 70 |

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|---|---|
| **Course Outcome** | Basic concepts of Emergency Management and basic processes related to its operation<br>Combating emergencies<br>Preparing an emergency plan<br>Provisions of the Regulation on Emergencies in Workplaces<br>Determining preventive and restrictive measures |
| **Aims of the course** | To include the basic concepts of Emergency Management and the basic processes related to its operation, to ensure that they are informed and that they learn the obligations of the parties and occupational health and safety measures during the execution of these services. |

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| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | X |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| **Department**<br>Department of Statistics | | | **Date** |
|---|---|---|---|
| **Course Unit Code**<br>YMH3128 | **Course Unit Title**<br>Artificial Intelligence | **Semester/Year**<br>Spring / 3 | **Number of ECTS Credits**<br>3 |
| **Language of Instruction** | Turkish | | |
| **Type of Course Unit** | Optional | | |
| **Prerequisites and co-requisites** | - | | |
| **Address of course** | - | | |

| Local Credit | Theoretical | Practical | Laboratory | Presentation | Project |
|---|---|---|---|---|---|
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | Artificial intelligence algorithms, machine learning, deep learning, natural language processing and decision-making systems are covered. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction and Basic Concepts |
| **2** | Problem Solving and Search Algorithms |
| **3** | Introduction to Machine Learning |
| **4** | Linear Regression and Logistic Regression |
| **5** | Decision Trees and Random Forests |
| **6** | K Nearest Neighbors (KNN) and Support Vector Machines (SVM) |
| **7** | Practical applications and examples |
| **8** | Clustering Algorithms |
| **9** | Introduction to Deep Learning |
| **10** | Convolutional Neural Networks (CNN) |
| **11** | Recurrent Neural Networks (RNN) and Natural Language Processing (NLP) |
| **12** | Reinforcement Learning |
| **13** | Artificial Intelligence Ethics and Future |
| **14** | Student Project Presentations |

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| **Course Resources** | **Artificial Intelligence: A Modern Approach" - Stuart Russell, Peter Norvig**<br>**"Deep Learning" - Ian Goodfellow, Yoshua Bengio, Aaron Courville**<br>**"Pattern Recognition and Machine Learning" - Christopher M. Bishop** |

| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
|---|---|---|---|
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |

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|---|---|
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 50 |
| | **Computer Sciences** | 50 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | To be able to define the basic concepts and terms in the field of artificial intelligence.<br>To be able to explain the basic concepts and types of machine learning.<br>To be able to apply linear and logistic regression models.<br>To be able to explain the basic concepts and areas of use of deep learning.<br>To be able to define the basic principles and architecture of artificial neural networks. |
| **Aims of the course** | It aims to teach students the basic and advanced concepts of artificial intelligence, various artificial intelligence algorithms and how to implement these algorithms. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | X |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |

| | | | | |
|---|---|---|---|---|
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

| **Department** | | **Academic Year** | **Date** | |
|---|---|---|---|---|
| Department of Statistic | | | | |
| **Course Unit Code** | **Course Unit Title** | **Semester/Year** | **Number of ECTS Credits** | |
| YBS 3130 | Information Systems Security and Risk Management<br>Compulsory | 5 / 3 | 3 | |
| **Language of Instruction** | Turkish | | | |
| **Type of Course Unit** | Optional | | | |
| **Prerequisites and co-requisites** | - | | | |
| **Address of course** | - | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | - | | | | |
| **Assistants** | - | | | | |

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| **Course content** | To provide students with an indepth understanding and practical skills in information systems security and risk management. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction and Basic Concepts |
| **2** | Threats and Vulnerabilities |
| **3** | Risk Management and Assessment |
| **4** | Information Security Policies and Standards |
| **5** | Cryptography and Data Security |
| **6** | Network Security |
| **7** | Access Control and Identity Management |

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|---|---|
| **8** | Identity management and MFA applications |
| **9** | Incident Management and Breach Response |
| **10** | Security Audits and Tests |
| **11** | Cloud Security |
| **12** | Mobile and Application Security |
| **13** | Sustainable Security and Education |
| **14** | Student project presentations |

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| **Course Resources** | Computer Security Basics" by Rick Lehtinen and Deborah Russell (Chapter 1)<br>"The Basics of Information Security" by Jason Andress (Chapter 2) |

| | | | |
|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 50 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 50 |

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| **Course Outcome** | Students have basic knowledge about the theory of Abstract algebra. |
| **Aims of the course** | 1. Understanding basic concepts of information security and risk management.<br>2. Use basic network security concepts and tools.<br>3. Identifying threats and vulnerabilities to information systems |

| | |
|---|---|
| | 4. Gaining the ability to create a risk matrix and manage risks.<br>5. Gaining the ability to create and implement information security policies. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | X |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| **Department**<br>Department of Statistic | | **Academic Year** | **Date** |
|---|---|---|---|
| **Course Unit Code**<br>MAT 3132 | **Course Unit Title**<br>TRANSFORMATIONS | **Semester/Year**<br>5 / 3 | **Number of ECTS Credits**<br>3 |
| **Language of Instruction** | Turkish | | |
| **Type of Course Unit** | Optional | | |

| | | | | | |
|---|---|---|---|---|---|
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | - | | | | |
| **Assistants** | - | | | | |

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|---|---|
| **Course content** | To provide the ability to apply transformations. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Generating function and examples |
| **2** | Characteristic function and inverse transform |
| **3** | Uniform distribution and its applications |
| **4** | Generalized function |
| **5** | Power series |
| **6** | Fourier expansion using generalized function |
| **7** | Fourier transform and Fourier integral transform |
| **8** | Introduction to Wavelet transform |
| **9** | Different Wavelet transforms |
| **10** | Discrete Wavelet Transform |
| **11** | Bernstein Polynomial |
| **12** | MITTAG-LEFFLER operator |
| **13** | Growth curves |
| **14** | Orthogonal polynomials and bases |

| | |
|---|---|
| **Course Resources** | Textbooks and notes: Basic types of transformations, transformation matrices, and example problems. |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |

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|---|---|---|---|
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 50 |
| | **Computer Sciences** | 50 |
| | **Programming Design** | 0 |
| | **Social Sciences** | |

| | |
|---|---|
| **Course Outcome** | Students have basic knowledge about the theory of Abstract algebra. |
| **Aims of the course** | 1. Define and apply basic geometric transformations such as translation, reflection, rotation and scaling.<br>2. Can use matrices representing two-dimensional transformations and calculate transformations with these matrices.<br>3. Can produce solutions to real world problems using transformations.<br>4. Be able to apply the concepts of kernel function and basis function. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| | Learning outcomes | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | X |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |

| | | | | |
|---|---|---|---|---|
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

**SEMESTER 7**

| **Department**<br>Department of Statistic | | | **Academic Year** | **Date** | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>İST 4101 | **Course Unit Title**<br>IST4101 Discrete Parameter Markov Chains | | **Semester/Year**<br>7 / 4 | **Number of ECTS Credits**<br>6 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 4 | 4 | 0 | - | - | - |
| **Name of Lecturers** | - | | | | |
| **Assistants** | - | | | | |

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|---|---|
| **Course content** | To be able to make statistical predictions by establishing probabilistic models of real problems. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Definition, classification, numerical characteristics and examples of stochastic processes. |
| **2** | Finite state discrete parameter stochastic processes and transition probabilities between states. |
| **3** | Discrete parameter Markov chain, one-step transition probabilities and initial distribution. |

| | |
|---|---|
| **4** | High-step transition probabilities and classification of states. |
| **5** | Independent increments stochastic process and random walk example. |
| **6** | Markov chain with absorbing state and probabilities of being absorbed |
| **7** | Limit distribution of stochastic process and game problem. |
| **8** | Kolmogorov's difference equations. |
| **9** | Branching processes. |
| **10** | Two-state Markov chain. |
| **11** | Birth-death process |
| **12** | The importance of birth-death process in Markov tail models. |
| **13** | Introduction to continuous parameter Markov chain |
| **14** | Stochastic process with Poisson distribution and counting problem. |

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| **Course Resources** | Probability and Random Processes, Geoffrey Grimmett ve David Stirzaker, Oxford üniversty press. |

| | | | |
|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 50 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 50 |

| | |
|---|---|
| **Course Outcome** | To be able to make statistical predictions by establishing probabilistic models of real problems. |
| **Aims of the course** | 1. Constructs a probability model of a real problem.<br>2. It can make statistical predictions through probability models.<br>3. Can decide whether the approach to any problem is probabilistic or deterministic. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | X |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| **Department**<br>Department of Statistic | | **Academic Year** | **Date** |
|---|---|---|---|
| **Course Unit Code** | **Course Unit Title** | **Semester/Year** | **Number of ECTS Credits** |

| İST 4103 | Report Writing and Presentation Skills | 7 / 4 | 6 |
|---|---|---|---|
| **Language of Instruction** | Turkish | | |
| **Type of Course Unit** | Compulsory | | |
| **Prerequisites and co-requisites** | - | | |
| **Address of course** | - | | |

| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
|---|---|---|---|---|---|
| 3 | 3 | 0 | - | - | - |

| **Course content** | In this course, students learn how to make an effective presentation of the project they have completed. |
|---|---|

**Weekly Detailed Course Contents**

| **Week** | **Topic** |
|---|---|
| **1** | Course Introduction and Basic Concepts |
| **2** | Academic Writing and Technical Writing Rules |
| **3** | Data Collection and Organization |
| **4** | Building Blocks of the Report (Sections) |
| **5** | Bibliography and Citation Techniqu |
| **6** | Use of Graphs and Tables |
| **7** | Language and Style |
| **8** | Editing and evaluating a written report |
| **9** | Presentation Preparation: Visual Support Tools |
| **10** | Presentation Techniques and Body Language |
| **11** | Dealing with Difficult Audiences |
| **12** | Practical Presentation Studies |
| **13** | Report and Presentation Evaluation Criteria |
| **14** | Final Presentations |

| **Course Resources** | "Academic Writing and Presentation Techniques" Ali Öztürk<br>"Effective Presentation Techniques" Dale Carnegie |
|---|---|

| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
|---|---|---|---|
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |

| | | | |
|---|---|---|---|
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 20 |
| | **Computer Sciences** | 30 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 50 |

| | |
|---|---|
| **Course Outcome** | This course aims to develop students' effective report writing and presentation skills. It teaches technical and academic writing rules, presentation preparation techniques enriched with visual supports, and effective communication methods. |
| **Aims of the course** | 1. Can prepare reports by learning academic and technical writing rules.<br>2. It can collect and analyze data and create a structured report.<br>3. Can use bibliography and citation techniques appropriate for different reporting types.<br>4. Can make a successful presentation using effective communication, body language and tone of voice techniques.<br>5. Can acquire skills in interacting with audiences and dealing with difficult questions. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |

| | | | | |
|---|---|---|---|---|
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | X |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

| **Department** | | **Academic Year** | **Date** |
|---|---|---|---|
| Department of Statistic | | | |
| **Course Unit Code** | **Course Unit Title** | **Semester/Year** | **Number of ECTS Credits** |
| İST 4105 | Research Methods in Social Sciences | 7 / 4 | 4 |
| **Language of Instruction** | Turkish | | |
| **Type of Course Unit** | Selective | | |
| **Prerequisites and co-requisites** | - | | |
| **Address of course** | - | | |

| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
|---|---|---|---|---|---|
| 3 | 3 | 0 | - | - | - |

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|---|---|
| **Course content** | Quantitative and qualitative research methods, data collection techniques, sampling strategies and analysis processes are examined. |

**Weekly Detailed Course Contents**

| **Week** | **Topic** |
|---|---|
| **1** | Research in Social Sciences |
| **2** | Research Process and Determining Research Hypothesis |
| **3** | Types of Research |
| **4** | Literature Review and Management of Resources |
| **5** | Research Design and Ethical Principles |
| **6** | Data Collection Techniques (Quantitative Methods) |
| **7** | Data Collection Techniques (Qualitative Methods) |
| **8** | Midterm exam or project evaluation for research design |
| **9** | Quantitative Data Analysis |

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|---|---|
| **10** | Qualitative Data Analysis |
| **11** | Mixed Methods Research |
| **12** | Presenting and Interpreting Research Findings |
| **13** | Research Report Writing and Publication Process |
| **14** | Submission of research proposals (student projects) |
| **Course Resources** | Karasar, N. (2022). Scientific Research Method. Nobel Publishing Distribution. |

| | | | |
|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 50 | |
| | **Computer Sciences** | 0 | |
| | **Programming Design** | 0 | |
| | **Social Sciences** | 50 | |
| **Course Outcome** | Application of research methods used in social sciences. | | |
| **Aims of the course** | 1. Will gain the ability to determine the research problem, develop hypotheses and plan the research process.<br>2. Will gain the ability to conduct literature review and use academic resources effectively<br>3. Apply quantitative and qualitative data collection techniques and evaluate the advantages and limitations of these techniques.<br>4. Select and apply appropriate techniques to analyze the collected data. | | |
| **The way of processing course** | Face to face | | |

| **Relation of the course with program outcomes** |
|---|

| Learning outcomes | | 1 | 2 | 3 |
|---|---|---|---|---|
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | X |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| **Department**<br>Department of Statistic | | | **Academic Year** | **Date** | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>İST 4107 | **Course Unit Title**<br>BIOSTATISTICS | | **Semester/Year**<br>7 / 4 | **Number of ECTS Credits**<br>3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Optional | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |

| | | | | | |
|---|---|---|---|---|---|
| 3 | 3 | 0 | - | - | - |

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|---|---|
| **Course content** | Application of statistical methods to the health field. |

**Weekly Detailed Course Contents**

| Week | Topic |
|---|---|
| **1** | Definition of Statistics and Biostatistics; Descriptive Statistics Data. |
| **2** | Classification of Average, Location Parameters, Histogram, Bar Chart, Leaf Chart, etc.; Descriptive Statistics. |
| **3** | Distribution; Box-Plot Graphics; Error Bar etc. Examples; Examination with the Help of Tables and Graphs. |
| **4** | Theoretical Distributions. |
| **5** | Tests and Normality Graphs. |
| **6** | Sampling Distributions and Confidence Intervals. |
| **7** | Research and Sampling Methods. |
| **8** | Introduction to Hypothesis Testing |
| **9** | Hypothesis Tests (Single Sample Tests) |
| **10** | Hypothesis Tests (Independent Two Sample Tests) |
| **11** | Hypothesis Tests (Dependent Two Sample Tests) |
| **12** | Correlation and Correlation Coefficient Tests |
| **13** | Simple and Multivariate Linear Regression Analysis |
| **14** | Risk Measures. |

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|---|---|---|---|
| **Course Resources** | Biostatistical Analysis, Books a la Carte Edition, Jerold H. Zar, Pearson, 2014. | | |
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 20 |
| | **Computer Sciences** | 30 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 50 |
| **Course Outcome** | Application of research methods used in social sciences. | |
| **Aims of the course** | 1. They understand the importance of statistical methods in studies.<br>2. They learn to decide on a sufficient sample size for a study.<br>3. They gain the ability to choose the right statistical method.<br>4. They learn to analyze and interpret data using statistical methods.<br>5. They learn to evaluate with statistical software. | |
| **The way of processing course** | Face to face | |

**Relation of the course with program outcomes**

| | Learning outcomes | 1 | 2 | 3 |
|---|---|---|---|---|
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | X |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |

**Contribution of the course**: 1:No 2:Partially 3:Completely

| **Department** | | **Academic Year** | **Date** |
|---|---|---|---|
| Department of Statistic | | | |
| **Course Unit Code** | **Course Unit Title** | **Semester/Year** | **Number of ECTS Credits** |
| İST 4109 | RISK ANALYSIS | 7 / 4 | 4 |

| | | | | | |
|---|---|---|---|---|---|
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Optional | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |

| | |
|---|---|
| **Course content** | Identifying, assessing, managing and controlling risks. |

**Weekly Detailed Course Contents**

| **Week** | **Topic** |
|---|---|
| **1** | Introduction and basic concepts |
| **2** | Risk and trust as random variables |
| **3** | Statistically the risk function, probabilistically the confidence function |
| **4** | Hazard rate |
| **5** | Some ratios used as statistics |
| **6** | Risk identification techniques |
| **7** | Risk as data |
| **8** | Acceptable risk |
| **9** | Risk Assessment and Measurement |
| **10** | Risk Response Strategies |
| **11** | Risk Monitoring and Control |
| **12** | Sectoral Risk Analysis |
| **13** | Enterprise Risk Management |
| **14** | Preventable risks |

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|---|---|
| **Course Resources** | "Risk Management" by Crouhy, Galai, and Mark, Chapter 1 "Fundamentals of Risk Management" by Paul Hopkin, Chapter 1 |

| | | | |
|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |

| | | |
|---|---|---|
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | |
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 20 |
| | **Computer Sciences** | 30 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 50 |
| **Course Outcome** | Application of research methods used in social sciences. | |
| **Aims of the course** | 1. Understanding and Defining the Concept of Risk<br>2. Implementing Risk Management Processes<br>3. Using Risk Identification and Assessment Techniques<br>4. Developing Risk Response Strategies | |
| **The way of processing course** | Face to face | |

**Relation of the course with program outcomes**

| | Learning outcomes | 1 | 2 | 3 |
|---|---|---|---|---|
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | X |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |

**Contribution of the course**: 1:No 2:Partially 3:Completely

| **Department**<br>Department of Statistics | | | **Date** | | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>İST4111 | **Course Unit Title**<br>Robust Estimation Methods | | **Semester/Year**<br>Fall / 4 | **Number of ECTS Credits**<br>4 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Optional | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

| **Course content** | Outlier robust estimation methods, robust regression, and robust estimation techniques in statistical models are discussed. |
|---|---|

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Overview of datasets, getting to know datasets, outlier analysis |
| **2** | Location and scale parameters for a dataset, determining the effects of outliers |
| **3** | Basic robust estimation methods for location and scale parameters |
| **4** | Basic robust estimation methods for location and scale parameters |
| **5** | Using M, S, MM estimator families for location and scale parameters |
| **6** | Using MM-Liu, Huber estimator families for location and scale parameters |
| **7** | Getting to know methods for robustness measurement |
| **8** | Midterm exam |
| **9** | Application of robustness measures such as influence function, breakpoint, maximum asymptotic bias to robust estimation methods of location and scale parameters |
| **10** | Using robust methods in regression models |
| **11** | Using robust methods in regression models |
| **12** | Using robust methods in regression models |
| **13** | R applications |
| **14** | R applications |

| **Course Resources** | Rousseeuw, P. J., & Leroy, A. M. (2005). Robust regression and outlier detection. John wiley & sons |
|---|---|

| | |
|---|---|
| | Sonnberger, H. (1989). Robust Regression and Outlier Detection |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | Can identify outliers in data<br>Recognize basic robust estimation methods<br>Can decide which robust method can be applied to a data set containing outliers<br>Can calculate robust estimators, can perform robust regression analysis<br>Can perform R applications. |
| **Aims of the course** | Understand estimation methods for datasets containing outliers (including multidimensional datasets) |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | X | |

| | | | | |
|---|---|---|---|---|
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | X |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | **Contribution of the course**: 1:No 2:Partially 3:Completely | |

| **Department**<br>Department of Statistics | | | **Date** | | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>İST4113 | **Course Unit Title**<br>High Dimensional Covariance Estimates | | **Semester/Year**<br>Fall / 4 | **Number of ECTS Credits**<br>4 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Optional | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |

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|---|---|---|---|---|---|
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | Covariance matrix estimation, spectral methods and applications in high-dimensional data are examined. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Overview of high-dimensional data examples and problems encountered in their analysis |
| **2** | Maximum likelihood estimator of covariance matrix in high-dimensional data |
| **3** | Eigenvalue and eigenvector calculation, condition number |
| **4** | Singular matrix problem |
| **5** | Examination of the effects of singularity on the results of multivariate analysis principal component analysis example |
| **6** | Application on gene data |
| **7** | Shrinkage method for covariance matrices |
| **8** | Midterm exam |
| **9** | Empirical Bayes estimator, eigenvalue, eigenvector, condition number review |
| **10** | Convex Sum estimator, eigenvalue, eigenvector, condition number review |
| **11** | Stipulated Ridge, Stipulated diogonal estimators, eigenvalue, eigenvector, condition number review |
| **12** | Oracle estimator, eigenvalue, eigenvector, condition number review |
| **13** | Applications on calculation and principal component analysis with Matlab |
| **14** | Applications on calculation and principal component analysis with Matlab |

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|---|---|
| **Course Resources** | Lam, C. (2020). High-dimensional covariance matrix estimation. Wiley Interdisciplinary reviews: computational statistics, 12(2), e1485. |

| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
|---|---|---|---|
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |

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|---|---|
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | |
| **Aims of the course** | Examining the covariance structure in high-dimensional data and solving the singular covariance problem |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | X |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |

| | | | | |
|---|---|---|---|---|
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

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|---|---|---|---|---|---|
| **Department**<br>Department of Statistics | | | | **Date** | |
| **Course Unit Code**<br>İST4115 | **Course Unit Title**<br>Statistical Analysis with MATLAB | | **Semester/Year**<br>Fall / 4 | **Number of ECTS Credits**<br>4 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Optional | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | Basic and advanced statistical analysis, data visualization and modeling techniques are applied using MATLAB. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | MATLAB interface, program introduction, basic operators |
| **2** | Functions and arithmetic operations in MATLAB |
| **3** | Data input and output |
| **4** | Data merging and splitting |
| **5** | Necessary tools for graph drawing |
| **6** | Calculating and interpreting descriptive statistics of data structure |
| **7** | Application and topic repetition |
| **8** | Single sample hypothesis testing with Matlab |
| **9** | Two sample hypothesis testing with Matlab |
| **10** | Analysis of variance and multiple comparison tests with Matlab |
| **11** | Introduction to linear models |

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|---|---|
| **12** | Linear models Developing students' knowledge and skills in statistical analysis with MATLAB |
| **13** | Modeling functions |
| **14** | Statistical toolbar functions |

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| **Course Resources** | Giri, N. C. (2003). Multivariate statistical analysis |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 50 |
| | **Computer Sciences** | 50 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

| | |
|---|---|
| **Course Outcome** | Ability to apply basic arithmetic operations and basic operators in Matlab<br>Creation of descriptive statistics<br>Ability to apply hypothesis tests<br>Ability to apply variance analysis<br>Ability to apply linear models |
| **Aims of the course** | Developing students' knowledge and skills in statistical analysis with MATLAB |
| **The way of processing course** | Face to face |

| Relation of the course with program outcomes | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | X |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| **Department**<br>Department of Statistics | | | | **Date** | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>İST4117 | **Course Unit Title**<br>Operations Applications with Package Programs | | **Semester/Year**<br>Fall / 4 | **Number of ECTS Credits**<br>4 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Optional | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |

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|---|---|---|---|---|---|
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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|---|---|
| **Course content** | Operations research techniques, optimization algorithms and decision-making processes are analyzed with statistical package programs. |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction to operations research programs |
| **2** | Introduction to operations research, basic concepts |
| **3** | Modeling of simple linear programming problems. |
| **4** | Solving linear programming problems using the simplex method. |
| **5** | Duality and sensitivity analysis applications |
| **6** | Transportation problems and solution methods |
| **7** | Assignment problems and solution techniques |
| **8** | Network models and solution techniques |
| **9** | Decision theory and decision trees |
| **10** | CPM (Critical Path Method) and PERT (Program Evaluation and Review Technique) |
| **11** | Inventory models and stock control systems. |
| **12** | Queue theory and applications. |
| **13** | Multi-criteria decision making techniques. |
| **14** | General review and application |

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| **Course Resources** | **Giri, N. C. (2003).** ***Multivariate statistical analysis*** |

| | | | |
|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least | | |

| | |
|---|---|
| | YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 40 |
| | **Computer Sciences** | 30 |
| | **Programming Design** | 30 |
| | **Social Sciences** | 0 |

| | |
|---|---|
| **Course Outcome** | Ability to perform programming data entry<br>Ability to apply the Simplex method<br>Ability to apply transportation and assignment problems<br>Ability to apply CPM and PERT methods<br>Ability to apply queuing theory |
| **Aims of the course** | Introduction and use of operations research programs |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | X |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |

| | | | | |
|---|---|---|---|---|
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

| | | | | | |
|---|---|---|---|---|---|
| **Department**<br>Department of Statistics | | | | **Date** | |
| **Course Unit Code**<br>YMH4119 | **Course Unit Title**<br>Data Analysis with Artıfıcal İntelligence | | **Semester/Year**<br>Fall / 4 | **Number of ECTS Credits**<br>4 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Selective | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction and Basic Concepts |
| **2** | Basic Methods in Data Analysis |
| **3** | Machine Learning and Data Analysis |
| **4** | Linear Regression and Applications |
| **5** | Logistic Regression and Classification Techniques |
| **6** | Decision Trees and Ansamble Methods |
| **7** | Model creation and evaluation, Practical examples and applications |
| **8** | Support Vector Machines and Kernel Methods |
| **9** | Clustering Techniques and Dimension Reduction |

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| **10** | Artificial Neural Networks and Deep Learning |
| **11** | Natural Language Processing (NLP) and Text Analysis |
| **12** | Time Series Analysis and Forecast Models |
| **13** | Project Studies and Case Studies |
| **14** | Student Project Presentations |

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| **Course Resources** | **"Python Machine Learning" - Sebastian Raschka, Vahid Mirjalili**<br>**"Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow" - Aurélien** |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 40 |
| | **Computer Sciences** | 60 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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| **Course Outcome** | -Understanding the development and change of economic problems in the 20th century<br>- Understanding the political approaches that arise in overcoming the problems encountered<br>- Understanding the effects of political approaches on the solution process of problems<br>-To provide information infrastructure on structural problems of developing economies<br>-To analyze the reflections of the economic crises in the world on other countries |

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| **Aims of the course** | It aims to teach students the basic concepts of artificial intelligence, data analysis techniques and real-world applications of these techniques. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | X |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| **Department**<br>Department of Statistics | | | **Date** |
|---|---|---|---|
| **Course Unit Code**<br>İKT4121 | **Course Unit Title**<br>World Economy | **Semester/Year**<br>Fall / 4 | **Number of ECTS Credits**<br>4 |
| **Language of Instruction** | Turkish | | |
| **Type of Course Unit** | Selective | | |
| **Prerequisites and co-requisites** | - | | |

| Address of course | - | | | | |
|---|---|---|---|---|---|
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

| **Course content** | |
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| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Entry |
| **2** | Turkey's growth problem throughout the 20th century |
| **3** | Turkey's growth problem throughout the 20th century Employment problem in general |
| **4** | The problem of price stability in terms of periods |
| **5** | The problem of income distribution |
| **6** | Public finance problem before the 1980s |
| **7** | Evaluation of the general situation before the January 24, 1980 decisions and the process |
| **8** | Midterm |
| **9** | General economic situation since January 24, 1980 to the present |
| **10** | Public financing deficit and implemented programs |
| **11** | Measures taken related to domestic and foreign borrowing |
| **12** | The development of capital markets and financing problems of the private sector |
| **13** | Relations with the IMF and their reflections on the real and financial sectors of the relations |
| **14** | General analysis of the global crisis-Global crisis and national economy |

| **Course Resources** | Ayhan Aytaç, Gökhan Sönmezler, Güney Çetin Gürkan, Mehmet Serkan, Nagihan Oktayer, Sadi Uzunoğlu, Sudi Apak, Uğur Civelek, Current Economic Problems: World Economy, Literatür Publishing, 2010. |
|---|---|

| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
|---|---|---|---|
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |

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| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. |

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| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 50 |
| | **Computer Sciences** | 50 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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| **Course Outcome** | -To understand the development and change of economic problems in the 20th century<br>-To understand the political approaches that emerge in overcoming the problems encountered<br>-To understand the effects of political approaches on the solution process of problems<br>-Providing information infrastructure about the structural problems of developing economies<br>-Analyzing the reflections of economic crises in the world on other countries |
| **Aims of the course** | Risk management and risk assessment, evaluation of occupational risks, sources of danger and risk assessment methodologies for the protection of employees' health and ensuring their safety. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | X |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |

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|---|---|---|---|---|
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

| **Department** | | | **Date** | | |
|---|---|---|---|---|---|
| Department of Statistics | | | | | |
| **Course Unit Code** | **Course Unit Title** | | **Semester/Year** | **Number of ECTS Credits** | |
| İSG4123 | RISK MANAGEMENT AND EVALUATION | | Fall / 4 | 4 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Selective | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

| **Course content** | |
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| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Risk Management Basic Processes |
| **2** | Risk Assessment Stages |
| **3** | Identification and Rating of Risks |
| **4** | Hazard Sources Based on Risk Assessment |
| **5** | Hazard Sources Based on Risk Assessment |
| **6** | Hazard Sources Based on Risk Assessment |
| **7** | Risk Assessment Provisions in Laws and Regulations |
| **8** | Risk Assessment Provisions in Laws and Regulations |

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| **9** | Qualitative Risk Analysis Methods |
| **10** | Qualitative Risk Analysis Methods |
| **11** | Qualitative Risk Analysis Methods |
| **12** | Qualitative Risk Analysis Methods |
| **13** | Qualitative Risk Analysis Methods |
| **14** | Qualitative Risk Analysis Methods |

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| **Course Resources** | Occupational Health and Safety Law No. 6331, Risk Assessment Regulation, Lecture Notes |

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| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 50 |
| | **Computer Sciences** | 50 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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| **Course Outcome** | -Evaluation of occupational risks,<br>-Causes and factors affecting work accidents and occupational diseases,<br>-Deciding how to approach risk management activities and how to carry out these activities,<br>-Making qualitative assessments of risks and prioritizing their impact on activity objectives,<br>-Measuring the likelihood and impact of risks, predicting their impact on goals, |

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| **Aims of the course** | Risk management and risk assessment, evaluation of occupational risks, sources of danger and risk assessment methodologies for the protection of employees' health and ensuring their safety. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | X |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| **Department** | | | **Date** |
|---|---|---|---|
| Department of Statistics | | | |
| **Course Unit Code** | **Course Unit Title** | **Semester/Year** | **Number of ECTS Credits** |
| YMH4125 | Bioinformatics | Fall / 4 | 4 |
| **Language of Instruction** | Turkish | | |

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|---|---|---|---|---|---|
| **Type of Course Unit** | Selective | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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| **Course content** | |

| **Weekly Detailed Course Contents** | |
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| **Week** | **Topic** |
| **1** | Overview of the field of bioinformatics |
| **2** | Practical knowledge on the structure and use of common biological data databases |
| **3** | Examination of the structure of DNA and RNA Sequences |
| **4** | Sequence Analysis: Comparative genomics, alignment, BLAST algorithm and derivatives |
| **5** | Next Generation Sequencing |
| **6** | Genome Analysis I: Genome sequencing |
| **7** | Genome Analysis II Gene finding, Promotor, Exon and Intron regions recognition |
| **8** | Protein Bioinformatics |
| **9** | Visa Exam |
| **10** | To define and apply basic and advanced concepts in Computational Biology fields |
| **11** | Drug design and molecular dynamics simulation |
| **12** | Examination of artificial intelligence methods in bioinformatics |
| **13** | Bioinformatics applications (submitting articles) |
| **14** | Bioinformatics applications (submitting articles) |

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| **Course Resources** | Course notes, software tools, academic publications |

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| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |

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|---|---|---|---|
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 60 |
| | **Computer Sciences** | 40 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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| **Course Outcome** | -Ability to follow current literature in the field of bioinformatics, make technical presentations, listen and write articles at academic level.<br>-Ability to use bioinformatics data used in different fields with artificial intelligence techniques, to define and apply basic and advanced concepts in the fields of bioinformatics and computational biology.<br>-Introducing bioinformatics research and applications to students<br>-Students will be provided with basic knowledge and skills that will be useful in their future careers in the field of bioinformatics. |
| **Aims of the course** | i) to train the student in Computational Biology, Genome Processing, DNA, RNA, Next Generation Sequencing, Genome Analysis, Databases and Ontologies, Protein Bioinformatics, which are the main sub-branches of bioinformatics, ii) to teach students the application of machine learning and artificial intelligence techniques to the fields of bioinformatics iii) to study the application fields of drug design and molecular discovery |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |

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|---|---|---|---|---|
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | X |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

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|---|---|---|---|---|---|
| **Department**<br>Department of Statistics | | | | **Date** | |
| **Course Unit Code**<br>YBS4127 | **Course Unit Title**<br>SUPPLY CHAIN METHOD | | **Semester/Year**<br>Fall / 4 | **Number of ECTS Credits**<br>4 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Selective | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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|---|---|
| **Course content** | |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |

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|---|---|
| **1** | Introduction and Basic Concepts |
| **2** | Supply Chain Strategy and Design |
| **3** | Demand Forecasting and Planning |
| **4** | Inventory Management |
| **5** | Supply Management |
| **6** | Production Planning and Control |
| **7** | Logistics and Distribution Management |
| **8** | Logistics and distribution networks design |
| **9** | Supply Chain Performance Measurement |
| **10** | Risk Management and Resilience |
| **11** | Information Technology and Supply Chain |
| **12** | Global Supply Chain Management |
| **13** | Sustainable Supply Chain Management |
| **14** | Presentation of student projects |

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| **Course Resources** | ***"Supply Chain Management: Strategy, Planning, and Operation" by Sunil Chopra and Peter Meindl***<br>***"Designing and Managing the Supply Chain" by David Simchi-Levi, Philip Kaminsky, and Edith Simchi-Levi***<br>***"Logistics Management and Strategy: Competing Through the Supply Chain" by Alan Harrison and Remko van Hoek*** |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. | | |

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| | In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 50 |
| | **Computer Sciences** | 50 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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| **Course Outcome** | -Gain the ability to comprehensively understand and apply all aspects of supply chain management.<br>-Developing the ability to effectively manage supply chain processes.<br>-Gain the ability to produce solutions and think strategically for real-world problems.<br>-Developing teamwork, analytical thinking and problem solving skills. |
| **Aims of the course** | It aims to teach students the basic concepts, strategies and practices of supply chain management. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | X |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| Department<br>Department of Statistics | | | | Date | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>MAT4139 | **Course Unit Title**<br>Custom Defined Functions | | **Semester/Year**<br>Fall / 4 | **Number of ECTS Credits**<br>4 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Selective | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

| **Course content** | |
|---|---|

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Gamma function and integral. |
| **2** | Beta function and integral. |
| **3** | Error function and standard normal distribution. |
| **4** | Laplace transform. |
| **5** | Characteristic function and its applications. |
| **6** | Uniform distribution and generalized function. |
| **7** | Bernstein polynomial. |
| **8** | Growth curves. |
| **9** | Orthogonal condition. |
| **10** | Orthogonal functions. |
| **11** | Fourier expansion. |
| **12** | Fourier integral |
| **13** | Finding the polynomial that estimates the integrable function within a certain range. |
| **14** | Wavelet transform |
| | **Special Functions. Z. X. Wang, D. R. Guo · 1989, ISBN: 9789971506674, 997150667X** |

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|---|---|---|---|
| **course Resources** | | | |
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 50 |
| | **Computer Sciences** | 50 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | -Understanding the concept of generalized function.<br>- Can match the basic components and orthogonal transformation.<br>-Can match the Laplace transform and the moment generating function.<br>-Can match the characteristic function and the Fourier transform. |
| **Aims of the course** | To ensure that the methods used in statistical theory are matched with their counterparts used in applied mathematics. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | X |
| **2** | Indicates the place and importance of statistics in professional life. | | | |

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|---|---|---|---|---|
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

**SEMESTER 8**

| **Department**<br>Department of Statistics | | | **Date** | | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>İST4102 | **Course Unit Title**<br>Continuous Parameterized Markov Chains | | **Semester/Year**<br>Spring /4 | **Number of ECTS Credits**<br>6 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 4 | 4 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

| **Course content** | |
|---|---|

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Binomial process and its approach to the Poisson process. Definition of the Poisson process, including in the differential approach. |
| **2** | Definition of stochastic processes with continuous parameter discrete state space. |
| **3** | Properties of the Poisson process and the birth-death process with continuous parameters. |
| **4** | Ratio matrix. |
| **5** | Continuous parameter Markov chain, determination of the rate matrix and the concept of embedded Markov chain. |
| **6** | Establishment of the discrete parameter process representing the continuous parameter Markov chain. |
| **7** | Introduction to the stochastic queue model: Introduction of the M/M/1 model and calculation of its indicators. |
| **8** | Poisson arrival stream. |
| **9** | Multichannel Markov queue models. |
| **10** | Erlang distribution and queue model. |
| **11** | Kolmogorov differential equations. |
| **12** | Stochastic processes of second order |
| **13** | Stochastic differential. |
| **14** | Stochastic integral. |

| **Course Resources** | Probability and Random Processes. Geoffrey Grimmett and David Stirzaker, Oxford University Press. |
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| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
|---|---|---|---|
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who | | |

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|---|---|
| | has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 50 |
| | **Computer Sciences** | 50 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | -Optimizing a stochastic system.<br>-To make statistical inferences based on a stochastic model. |
| **Aims of the course** | To ensure that a stochastic system is defined along with its parameters. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | X |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| Department<br>Department of Statistics | | | | Date | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>İST4104 | **Course Unit Title**<br>Graduation Project | | **Semester/Year**<br>Spring / 4 | **Number of ECTS Credits**<br>6 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 0 | 6 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

| **Course content** | |
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| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction to Statistical Ethics and Basic Concepts |
| **2** | Literature Review and Determination of Research Problem |
| **3** | Data collection methods and data privacy and protection of personal data |
| **4** | Data Preprocessing and Basic Analysis |
| **5** | Selection of Statistical Methods |
| **6** | Data Visualization Techniques |
| **7** | Interim Report Presentation and Feedback |
| **8** | Modeling and Interpretation of Results |
| **9** | Interpretation and Discussion of Findings |
| **10** | Academic Writing Rules and Reporting |
| **11** | Project Writing Process and Revisions |
| **12** | Project Presentation Techniques |
| **13** | Preliminary Presentations and Evaluation |
| **14** | Final Report Submission and Presentation |

| **Course Resources** | Open access articles and statistical datasets |
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| | **In-Term studies** | Quantity | **Percentage (%)** |
|---|---|---|---|

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|---|---|---|---|
| **Assessment Methods and Criteria** | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 50 |
| | **Computer Sciences** | 50 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | |
| **Aims of the course** | |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | X | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | X | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |

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|---|---|---|---|---|
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | X | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | X | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | X |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | **Contribution of the course**: 1:No 2:Partially 3:Completely | |

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|---|---|---|---|---|---|
| **Department**<br>Department of Statistics | | | | **Date** | |
| **Course Unit Code**<br>İST4106 | **Course Unit Title**<br>Statistical Decision Theory | | **Semester/Year**<br>Spring / 4 | **Number of ECTS Credits**<br>4 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

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|---|---|
| **Course content** | |

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction to the Course and Basic Concepts |
| **2** | Decision Problems and Decision Theory Approach |

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|---|---|
| **3** | Probability Theory and Its Role in Decision Making |
| **4** | Loss and Risk Based Decision Theory |
| **5** | Utility Functions and Optimization |
| **6** | Bayesian Decision Theory |
| **7** | The role of parameter estimation and hypothesis testing in the decision process |
| **8** | Midterm exam or students' development of solution suggestions for a specific decision problem |
| **9** | Nonparametric Decision Theory |
| **10** | Multi-Criteria Decision Making |
| **11** | Group Decision Making and Consensus Methods |
| **12** | Statistical Simulation Techniques and Their Use in Decision Making |
| **13** | Real-Life Decision Making Applications |
| **14** | General Evaluation and Student Presentations |

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| **Course Resources** | Berger, J. O. (1985). Statistical Decision Theory and Bayesian Analysis. Springer.<br><br>*Pratt, J. W., Raiffa, H., & Schlaifer, R. (1995). Introduction to Statistical Decision Theory. The MIT Press* |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 50 |
| | **Computer Sciences** | 50 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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| **Course Outcome** | -Will be able to identify and analyze decision problems under uncertainty and risk.<br>-Will be able to learn and apply the basic principles of statistical decision theory.<br>-Will be able to make optimal decisions using utility and loss functions.<br>-Will be able to understand the role of parametric and nonparametric methods in decision processes.<br>-Will be able to adapt decision theory to real life problems. |
| **Aims of the course** | It aims to teach students the use of statistical methods in decision-making processes and to provide them with theoretical and practical skills in solving problems that require decision-making under uncertainty. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | X |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| | | |
|---|---|---|
| **Department** | | **Date** |

| Department of Statistics | | | | | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>İST4108 | **Course Unit Title**<br>Statistical Methods in Clinical Trials | | **Semester/Year**<br>Spring / 4 | **Number of ECTS Credits**<br>3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Selective | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

| **Course content** | |
|---|---|

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction and Basic Concepts |
| **2** | Planning and Design of Clinical Trials |
| **3** | Descriptive Statistics and Data Visualization |
| **4** | Hypothesis Tests and P-values |
| **5** | Analysis of Variance (ANOVA) |
| **6** | Regression Analysis |
| **7** | Survival Analysis |
| **8** | Repeated Measures and Mixed Effects Models |
| **9** | Meta-Analysis |
| **10** | Power Analysis in Clinical Trials |
| **11** | Multivariate Statistical Methods |
| **12** | Applications with package programs |
| **13** | Case Studies |
| **14** | Student project presentations |

| **Course Resources** | **-Clinical Trials: A Methodologic Perspective" by Steven Piantadosi**<br>**-Fundamentals of Clinical Trials" by Lawrence M. Friedman, Curt D. Furberg, David L. DeMets**<br>**-Survival Analysis: A Self-Learning Text" by David G. Kleinbaum, Mitchel Klein** |
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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 50 |
| | **Computer Sciences** | 50 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

| | |
|---|---|
| **Course Outcome** | -Statistical Methods in Clinical Trials Understanding the Design of Clinical Trials:<br>-Can perform hypothesis tests and interpret p-values in clinical trials.<br>-Can analyze clinical data and apply various statistical models using package programs.<br>-Can analyze real-world clinical data, interpret and report results.<br>-Can make predictions with models used in clinical trials and evaluate the accuracy of these predictions. |
| **Aims of the course** | To ensure that students learn the statistical methods used in clinical trials and how to apply these methods with package programs. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |

| | | | | |
|---|---|---|---|---|
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | X |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | **Contribution of the course**: 1:No 2:Partially 3:Completely | |

| **Department**<br>Department of Statistics | | | **Date** | | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>İST4110 | **Course Unit Title**<br>Data Envelopment Analysis | | **Semester/Year**<br>Spring / 4 | **Number of ECTS Credits**<br>3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Selective | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

| **Course content** | |
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| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction to Data Envelopment Analysis, basic concepts |
| **2** | CCR (Charnes, Cooper, Rhodes) model. |
| **3** | BCC (Banker, Charnes, Cooper) model. |
| **4** | The concept of scale returns and efficiency analysis. |
| **5** | Multi-input and multi-output DEA models |
| **6** | Relationships and effects between inputs and outputs. |
| **7** | Cross-efficiency and super-efficiency concepts |
| **8** | Data preparation, data cleaning and normalization techniques. |
| **9** | Integration of goal programming and DEA |
| **10** | Scale models with variable reversals. |
| **11** | Relaxed and Constrained DEA Models |
| **12** | Inferential Statistics and DEA |
| **13** | Benchmarking and comparison analysis using DEA. |
| **14** | General repetition and practice |

| **Course Resources** | **Giri, N. C. (2003).** ***Multivariate statistical analysis*** |
|---|---|

| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
|---|---|---|---|
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. | | |

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|---|---|
| | In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 50 |
| | **Computer Sciences** | 50 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

| | |
|---|---|
| **Course Outcome** | -Data can be entered into the program.<br>- Ability to apply normality assumptions<br>-Abilikte to apply hypothesis tests<br>-Ability to apply variance analysis<br>-Ability to apply regression analysis |
| **Aims of the course** | Application of Data Envelopment analysis and use of its programs |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | X |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| Department<br>Department of Statistics | | | | Date | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>İST4112 | **Course Unit Title**<br>Discrete Multivariate Data Analysis | | **Semester/Year**<br>8 / 4 | **Number of ECTS Credits**<br>3 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 2 | 2 | 0 | - | - | - |

| **Course content** | |
|---|---|

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Discrete multivariate random variables and distributions |
| **2** | Some discrete multivariate distributions and their properties |
| **3** | Contingency tables |
| **4** | Analyses and inference based on contingency tables |
| **5** | Analysis and models for binary response variables |
| **6** | Log-linear models and analysis |
| **7** | Log-linear models and analysis |
| **8** | Midterm exam |
| **9** | Logit models and analysis |
| **10** | Probit models and analysis |
| **11** | Logistic regression model and analysis |
| **12** | Logistic regression model and analysis |
| **13** | Discrete Multivariate Data Analysis package program applications |
| **14** | Discrete Multivariate Data Analysis package program applications |

| **Course Resources** | |
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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | |
| **Aims of the course** | |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Learns discrete random vectors and the probability distributions of random vectors. | | | |
| **2** | Understands the structure of cross-tabulation and makes inferences. | | | |
| **3** | Recognizes and analyzes models related to binary response variables. | | | |
| **4** | Recognizes and analyzes log-linear, logit, and probit models. | | | |
| **5** | Learns and performs logistic regression analysis. | | | |
| **6** | | | | |

| | | | | |
|---|---|---|---|---|
| **7** | | | | |
| **8** | | | | |
| **9** | | | | |
| **10** | | | | |
| **11** | | | | |
| **12** | Having the ability to develop computer programs using mathematical knowledge | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| | Learning outcomes | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | X |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

| **Department**<br>Department of Statistics | | | **Date** |
|---|---|---|---|
| **Course Unit Code**<br>İST4114 | **Course Unit Title**<br>Simulation Techniques | **Semester/Year**<br>8 / 4 | **Number of ECTS Credits**<br>6 |

| | | | | | |
|---|---|---|---|---|---|
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 3 | - | - | - |

| **Course content** | |
|---|---|

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Basic Simulation Concepts |
| **2** | Discrete Event Simulation and Modeling Structures |
| **3** | Selection of Probability Distributions-I |
| **4** | Selection of Probability Distributions-II |
| **5** | Hypothesis Tests |
| **6** | Random Number Generators and Generating Random Numbers from Distributions |
| **7** | Simulation in Some Distributions – 1 |
| **8** | Simulation in Some Distributions – 2 |
| **9** | Algorithms and MATLAB |
| **10** | Generating Random Numbers and Performing Simulations in Some Distributions Using MATLAB |
| **11** | Monte Carlo Experiment and Simulation Method, Parameter Estimation with Simulation |
| **12** | Parameter Estimation with Simulation -1 |
| **13** | Parameter Estimation with Simulation -2 |
| **14** | Simulation Applications |

| **Course Resources** | |
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| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
|---|---|---|---|
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |

| | | | |
|---|---|---|---|
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

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|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

| **Course Outcome** | |
|---|---|
| **Aims of the course** | 1. Students can distinguish between classical sampling methods and simulation.<br>2. Students can generate random numbers from a continuous uniform distribution in the range (0,1) using random number generators.<br>3. Students can determine how to generate random numbers from any distribution using the inverse transformation method.<br>4. Students can describe how to estimate model parameters with simulation.<br>5. Students can estimate the parameters of a large-scale problem using simulation with MATLAB. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | X |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |

| | | | | |
|---|---|---|---|---|
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

| **Department** | | | **Date** | |
|---|---|---|---|---|
| Department of Statistics | | | | |
| **Course Unit Code** | **Course Unit Title** | **Semester/Year** | **Number of ECTS Credits** | |
| İST4116 | Statistical Information Criteria | 8 / 4 | 6 | |
| **Language of Instruction** | Turkish | | | |
| **Type of Course Unit** | Compulsory | | | |
| **Prerequisites and co-requisites** | - | | | |
| **Address of course** | - | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 3 | - | - | - |

| **Course content** | |
|---|---|

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction and Basic Concepts |
| **2** | Akaike Information Criterion (AIC) |

| | |
|---|---|
| **3** | Bayesian Information Criterion (BIC) |
| **4** | Other Information Criteria: AICc, DIC, WAIC |
| **5** | Evaluating Model Fit |
| **6** | Information Criteria and Model Complexity |
| **7** | Bayesian Approaches and Information Criteria |
| **8** | Multiple Model Comparison |
| **9** | Model Selection and Prediction Performance |
| **10** | Simulation and Real Data Applications |
| **11** | Applications of Information Criteria with Software Packages |
| **12** | Limitations and Criticisms of Information Criteria |
| **13** | Sample Applications |
| **14** | Student Project Presentations |

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|---|---|
| **Course Resources** | |

| | | | |
|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

| **Course Outcome** | |
|---|---|
| **Aims of the course** | 1. Understanding the basic concepts of information criteria<br>2. Evaluating model fit using information criteria.<br>3. Assessing the impact of information criteria on prediction performance. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | X |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| **Department**<br>Department of Statistics | | | **Date** |
|---|---|---|---|
| **Course Unit Code**<br>İST4118 | **Course Unit Title**<br>HISTORY OF STATISTICS | **Semester/Year**<br>8 / 4 | **Number of ECTS Credits**<br>3 |

| | | | | | |
|---|---|---|---|---|---|
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |

| **Course content** | |
|---|---|

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | General History of Statistics |
| **2** | Statistics in Health, Social, Science, and Engineering Fields |
| **3** | Prominent Statisticians in History (Abraham De Moivre, Bernoulli) |
| **4** | Prominent Statisticians in History (Carl Friedrich Gauss, Pearson) |
| **5** | Prominent Statisticians in History (Bernhard Riemann) |
| **6** | Prominent Statisticians in History (Markov) |
| **7** | Prominent Statisticians in History (Fisher, Kolmogorov) |
| **8** | Prominent Statisticians in History (Anderson) |
| **9** | Prominent Statisticians in History (Boris Vladimirovich Gnedenko) |
| **10** | Discovery of Normal Distribution |
| **11** | Recent Developments |
| **12** | The Future of Statistics, Importance in Artificial Intelligence |
| **13** | Turkish Statistical World |
| **14** | Statistical Society |

| **Course Resources** | |
|---|---|

| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
|---|---|---|---|
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |

| | | | |
|---|---|---|---|
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

| **Course Outcome** | |
|---|---|
| **Aims of the course** | 1. Students will recognize the historical development of the science of statistics and key milestones<br>2. Students will understand how statistical theories developed and the historical events that contributed to their development.<br>3. Students will comprehend the relationship between statistics and other scientific disciplines and how these relationships evolved throughout history.<br>4. Students will gain the ability to critically evaluate historical texts and studies.<br>5. Students will develop academic research skills on the history of statistics and improve their ability to conduct literature reviews in this field. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| | Learning outcomes | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | X |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |

| | | | | |
|---|---|---|---|---|
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

| **Department**<br>Department of Statistics | | | **Date** | | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>YMH4120 | **Course Unit Title**<br>Blockchain Technologies | | **Semester/Year**<br>8 / 4 | **Number of ECTS Credits**<br>4 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |

| **Course content** | |
|---|---|

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Course rationale, content, plan, method of delivery, and introduction to course resources |
| **2** | Introduction to Blockchain, three-dimensional virtual worlds, Metaverse ecosystem, IoT, Society 5.0, Industry 4.0 |

| | |
|---|---|
| **3** | SQL and NoSQL, blockchain databases, distributed file system, decentralized storage |
| **4** | Virtual reality applications in Unity, algorithm scenario creation |
| **5** | Augmented reality applications in Unity, innovative aspects, IoT applications |
| **6** | Mixed reality applications |
| **7** | Libraries, hardware and software resources for the Metaverse, virtual economy management |
| **8** | Digital twins |
| **9** | Blockchain, cold-hot wallet applications, crypto assets and NFTs, digital assets |
| **10** | Smart contracts and blockchain design |
| **11** | Web 3.0 databases, robotic process management, AutoML, ModelOPS, DataOPS approaches |
| **12** | Natural language processing and machine learning approaches for human-machine communication |
| **13** | Comparison of different Blockchain platforms and architectures |
| **14** | Blockchain future in light of technological developments, advantages and bottlenecks, ethical issues |

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|---|---|
| **Course Resources** | |

| | | | |
|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

| | |
|---|---|
| **Course Outcome** | |
| **Aims of the course** | 1. Python programming language for Metaverse and Web 3.0<br>2. Digital twin applications<br>3. Blockchain programming<br>4. Spatial computing in the Metaverse environment<br>5. Blockchain and smart contracts |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | X |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| | | |
|---|---|---|
| **Department** | | **Date** |

| Department of Statistics | | | | | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>İKT4122 | **Course Unit Title**<br>Financial Crises | | **Semester/Year**<br>8 / 4 | **Number of ECTS Credits**<br>4 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |

| **Course content** | |
|---|---|

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction |
| **2** | Basic Elements of Financial Crises |
| **3** | Causes of Financial Crises |
| **4** | Types of Financial Crises |
| **5** | Financial System |
| **6** | Asymmetric Information |
| **7** | Asymmetric Information (Continued) |
| **8** | Risk Sharing and Investments |
| **9** | Regulation Theory |
| **10** | Institutional Forms |
| **11** | The 1929 Crisis and Institutional Forms |
| **12** | 1973-1979 Oil Crisis |
| **13** | 2007-2008 Financial Crisis |
| **14** | Mexican and Asian Crises |

| **Course Resources** | • Selçuk, B. and Büyükşalvarcı, A. (2011). *History of Financial Crises from 1630 to 2010*, Çatı Kitapları.<br>• Krugman, P. (2019). *The Return of Depression Economics and the Global Crisis*, Literatür Yayınları. |
|---|---|

| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
|---|---|---|---|
| | **Mid-Term Exams** | 1 | 40 |

| | | | |
|---|---|---|---|
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | |
| **Aims of the course** | 1. Will be able to apply basic financial crisis concepts in decision-making processes.<br>2. Will be able to explain how economic and political factors affect financial crises.<br>3. Will be able to explain financial crises using the asymmetric information approach.<br>4. Will be able to analyze how financial crises impact individual investment behavior.<br>5. The greatest advantage of the course is learning to invest through risk sharing. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | X | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |

| | | | | |
|---|---|---|---|---|
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | X |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

| **Department**<br>Department of Statistics | | | **Date** | | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>İSG4124 | **Course Unit Title**<br>Occupational Health And Safety Management Systems | | **Semester/Year**<br>8 / 4 | **Number of ECTS Credits**<br>4 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |

| **Course content** | |
|---|---|

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |

| | |
|---|---|
| **1** | Management Systems |
| **2** | TS EN ISO 9000 Series Standards |
| **3** | ISO 14001 Environmental Management System |
| **4** | ISO 14001 Environmental Management Standards |
| **5** | ISO 22000 Food Safety Management Systems |
| **6** | Implementation, Verification, and Improvement of Food Safety Management Systems |
| **7** | Other Management Systems |
| **8** | Other Management Systems (Continued) |
| **9** | OHS Management System |
| **10** | OHS Management System Approach |
| **11** | OHS Management Systems |
| **12** | TS ISO 45001:2018 Occupational Health and Safety Systems |
| **13** | TS ISO 45001:2018 Occupational Health and Safety Systems (Continued) |
| **14** | System Executives According to TSE Standards |

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|---|---|
| **Course Resources** | TSE; TS EN ISO 9000, ISO 14001, ISO 22000, TS ISO 45001:2018, TSE; System Executives According to Standards |

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|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

| **Course Outcome** | |
|---|---|
| **Aims of the course** | 1. Will learn about the OHS Management System and OHS Management Systems.<br>2. Will understand the conditions and user manuals of management systems, as well as their aims and outputs.<br>3. Will understand the responsibilities of the state, employer, and employee in relation to OHS.<br>4. Will gain the ability to communicate effectively with a sense of professional and ethical responsibility.<br>5. Students will be made aware of OHS Management Systems |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | X |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| Department<br>Department of Statistics | | | | Date | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>YMH4126 | **Course Unit Title**<br>Cryptology | | **Semester/Year**<br>8 / 4 | **Number of ECTS Credits**<br>4 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |
| **Name of Lecturers** | | | | | |
| **Assistants** | - | | | | |

| **Course content** | |
|---|---|

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction to course objectives, goals, and learning outcomes; discussion of the selected current topic; analysis of successful project examples from previous semesters; information on course evaluation, presentation of the detailed roadmap |
| **2** | Fundamentals of Cryptography |
| **3** | Symmetric Encryption |
| **4** | Symmetric Encryption (Continued) |
| **5** | Asymmetric Encryption |
| **6** | Asymmetric Encryption (Continued) |
| **7** | Protocols |
| **8** | Protocols (Continued) |
| **9** | Creating GitHub repositories for developed libraries, preparing user manuals, and creating test documentation |
| **10** | Presentation of outputs obtained from the website as part of dissemination activities |
| **11** | Application Presentations |
| **12** | Application Presentations (Continued) |
| **13** | Application Presentations (Continued) |
| **14** | Application Presentations (Continued) |

| Course Resources | |
|---|---|

| Assessment Methods and Criteria | In-Term studies | Quantity | Percentage (%) |
|---|---|---|---|
| | Mid-Term Exams | 1 | 40 |
| | Quizzes | - | - |
| | Assignments | - | - |
| | Projects | - | - |
| | Term assignment | - | - |
| | Laboratory | - | - |
| | Other | - | - |
| | Final exam | 1 | 60 |
| On Assessment Methods and Criteria | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| Percentage of Course Category (%) | Mathematics and Basic Sciences | 100 |
|---|---|---|
| | Computer Sciences | 0 |
| | Programming Design | 0 |
| | Social Sciences | 0 |

| Course Outcome | |
|---|---|
| Aims of the course | 1. Understand the requirements for randomness.<br>2. Grasp statistical tests and their usage.<br>3. Gain the ability to apply cryptographic requirements.<br>4. Be able to prepare scientific outputs and reports.<br>5. This course is a challenge. You will have the opportunity to experience how much you trust yourself. |
| The way of processing course | Face to face |

| Relation of the course with program outcomes | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | X |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| **Contribution of the course**: 1:No 2:Partially 3:Completely | | | | |

| **Department**<br>Department of Statistics | | | | **Date** | |
|---|---|---|---|---|---|
| **Course Unit Code**<br>YBS4128 | **Course Unit Title**<br>Innovative Product and Service Design | | **Semester/Year**<br>8 / 4 | **Number of ECTS Credits**<br>4 | |
| **Language of Instruction** | Turkish | | | | |
| **Type of Course Unit** | Compulsory | | | | |
| **Prerequisites and co-requisites** | - | | | | |
| **Address of course** | - | | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |

| | | | | | |
|---|---|---|---|---|---|
| 3 | 3 | 0 | - | - | - |

| **Course content** | |
|---|---|

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Introduction and Basic Concepts |
| **2** | Design Thinking and Processes |
| **3** | User Research and Analysis |
| **4** | Idea Generation and Creativity Techniques |
| **5** | Prototyping and Testing |
| **6** | Product and Service Development Strategies |
| **7** | Project Management and Application |
| **8** | Using Project Management Tools |
| **9** | Marketing and Launch Strategies |
| **10** | Financial Planning and Investment |
| **11** | Sustainability and Social Responsibility |
| **12** | Technology and Innovation |
| **13** | Innovation in Global Markets |
| **14** | Student Project Presentations |

| **Course Resources** | |
|---|---|

| | | | |
|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who | | |

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|---|---|
| | has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

| **Course Outcome** | |
|---|---|
| **Aims of the course** | 1. Learn the basic concepts and theoretical foundations of innovative product and service design.<br>2. Learn user research methods and use them to identify user needs.<br>3. Generate innovative ideas using creative thinking techniques.<br>4. Develop marketing and launch strategies for innovative products and services.<br>5. Understand and apply concepts of sustainable product and service design. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| | Learning outcomes | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | X |

| | | | | |
|---|---|---|---|---|
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |

| **Department** | | | **Date** | |
|---|---|---|---|---|
| Department of Statistics | | | | |
| **Course Unit Code** | **Course Unit Title** | **Semester/Year** | **Number of ECTS Credits** | |
| MAT4130 | Metric and Normed Structures | 8 / 4 | 4 | |
| **Language of Instruction** | Turkish | | | |
| **Type of Course Unit** | Compulsory | | | |
| **Prerequisites and co-requisites** | - | | | |
| **Address of course** | - | | | |
| **Local Credit** | **Theoretical** | **Practical** | **Laboratory** | **Presentation** | **Project** |
| 3 | 3 | 0 | - | - | - |

| **Course content** | |
|---|---|

| **Weekly Detailed Course Contents** | |
|---|---|
| **Week** | **Topic** |
| **1** | Definition and properties of the metric concept. |
| **2** | Basic topological concepts. |
| **3** | Introduction to topological structures. |
| **4** | Convergence in metric spaces. Cauchy sequence. |
| **5** | Continuity in metric spaces: sequential continuity. |
| **6** | Closure of a set. |
| **7** | Complete metric spaces. |
| **8** | The concept and properties of norms. |
| **9** | The relationship between metric and norm. |
| **10** | Metric derived from a norm. |
| **11** | L1 and L2 norms. |
| **12** | Minimization problem. |
| **13** | Clustering problem. |
| **14** | Clustering methods. |

| **Course Resources** | |
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| | | | |
|---|---|---|---|
| **Assessment Methods and Criteria** | **In-Term studies** | Quantity | **Percentage (%)** |
| | **Mid-Term Exams** | 1 | 40 |
| | **Quizzes** | - | - |
| | **Assignments** | - | - |
| | **Projects** | - | - |
| | **Term assignment** | - | - |
| | **Laboratory** | - | - |
| | **Other** | - | - |
| | **Final exam** | 1 | 60 |
| **On Assessment Methods and Criteria** | A grade of success; is determined by using the relative evaluation system or the discretion of the instructor. In order to be able to evaluate the courses in which the relative evaluation system and the teaching staff member's discretion are applied, the final exam score of the student must be at least YSAS. Students who fall below this score are considered to fail directly. For the courses that can not be evaluated with the relative evaluation system, the distribution of the final grade of the final grade and the letter grades which are the equivalents of the success grades are determined by the consent of the instructor who gives the lesson using the table prepared by the Senate with 100 points. A student who has received a grade AA, BA, BB, CB or CC grade is deemed to have completed that course. A student who has received one of the grade DC or DD grades is deemed to have fulfilled that course condition. In order for a student who takes DD and DC letters to be counted as successful, the GNO must be at least 2.00. A student who receives a graded FF grade is considered to have failed that course. | | |

| | | |
|---|---|---|
| **Percentage of Course Category (%)** | **Mathematics and Basic Sciences** | 100 |
| | **Computer Sciences** | 0 |
| | **Programming Design** | 0 |
| | **Social Sciences** | 0 |

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|---|---|
| **Course Outcome** | |
| **Aims of the course** | 1. Understand the relationship between metric and norm concepts.<br>2. Understand what the metric difference means in statistics.<br>3 Grasp metric clustering methods.<br>4. Reduce the minimization problem to norm structures.<br>5. Establish a connection between the L1 norm and least squares. |
| **The way of processing course** | Face to face |

| **Relation of the course with program outcomes** | | | | |
|---|---|---|---|---|
| Learning outcomes | | 1 | 2 | 3 |
| **1** | Explains the concepts and principles of probability and statistics. | X | | |
| **2** | Indicates the place and importance of statistics in professional life. | | | |

| | | | | |
|---|---|---|---|---|
| **3** | Defines basic economic and legal concepts and principles. | | | |
| **4** | Produces statistical solutions to problems that may be encountered in professional life. | | | |
| **5** | Uses appropriate methods and techniques to obtain and/or organize statistical data. | | | |
| **6** | Establishes and uses software architecture. | | | |
| **7** | Can use techniques to solve problems involving deterministic, random and stochastic events in a statistical sense. | | | |
| **8** | Applies statistical analysis methods. | | | |
| **9** | Makes statistical inference (estimation, hypothesis testing, etc.). | | | |
| **10** | Produces solutions to problems in different disciplines using statistical techniques. | | | |
| **11** | Have the ability to write objective programs. | | | |
| **12** | It solves a created model with the help of package programs. | | | |
| **13** | Be able to interpret the interaction by distinguishing the difference between statistical methods. | | | |
| **14** | Be aware of the interaction of different disciplines with statistics. | | | X |
| **15** | Presents the results obtained using statistical methods verbally and visually. | | | |
| **16** | Have the ability to work effectively and productively both individually and collaboratively. | | | |
| **17** | In addition to their professional development, they constantly improve themselves by determining their educational needs in scientific, cultural, artistic and social fields in line with their interests and abilities. | | | |
| **18** | It has social, scientific and ethical values in the stages of collecting, interpreting and announcing data related to scientific fields where statistics is used. | | | |
| | | | | **Contribution of the course**: 1:No 2:Partially 3:Completely |