|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **COURSE INFORMATON** | | | | | | | |
| **Course Title** | | *Code* | *Semester* | *L+P Hour* | *Credits* | *ECTS* | |
| Computational Methods in Statistics I | | COMP265 | 3 | 3+0 | 3 | 5 | |
| **Prerequisites** | - | | | | | |

|  |  |
| --- | --- |
| **Language of Instruction** | English |
| **Course Level** | Bachelor's Degree (First Cycle Programmes) |
| **Course Type** | Compulsory |
| **Course Coordinator** |  |
| **Instructors** | Prof. Dr. Avadis Hacınlıyan, Asst. Prof. Dr. Engin Kandıran |
| **Assistants** | Staff |
| **Goals** | The objective of the course is to have the students identify basic statistical concepts in a computational setting; gain the ability to compile, process and abstract, report and interpret the data using computational methods involving spreadsheets. |
| **Content** | **Review of macros and data analysis tools in Excel. Collecting and processing large volumes of data with computers. Measures of central tendency and dispersion. Basic probability concepts. Binomial, Poisson normal and chi squared distributions. The central limit therem. Hypothesis testing. Variance analysis. Linear regression. Case studies, laboratory exercises, and projects on the computer, supporting topics covered in lectures**. |

|  |  |  |  |
| --- | --- | --- | --- |
| **Learning Outcomes** | **Program Learning Outcomes** | **Teaching Methods** | **Assessment Methods** |
| Describe basic concepts of statistics | 11 | 1, 2, 3 | A,C |
| List data gathering methods | 7 | 1, 2, 3 | A,C |
| Prepare and analyze measures of central tendency and dispersion (mean, standard deviation) (descriptive statistics). | 7 | 1, 2, 3 | A,C,E |
| Understand basic conceps of probability and probability distributions. | 8 | 1, 2, 3 | A,C |
| Understand spreadsheet macros and statistical commands. | 3 | 1, 2, 3 | A,E |
| Understand The binomial, Poisson, normal distribution and the central limit theorem. | 8 | 1, 2, 3 | A,C,E |
| Understand hypothesis testing and linear regression.. | 11 | 1, 2, 3 | A,C |

|  |  |
| --- | --- |
| **Teaching Methods:** | 1: Lecture, 2: Question-Answer, 3: Discussion, 4: Simulation, 5: Case Study |
| **Assessment Methods:** | A: Testing B: Presentation, C: Homework, D: Project, E: Laboratory |

|  |  |  |
| --- | --- | --- |
| **COURSE CONTENT** | | |
| **Week** | **Topics** | **Study Materials** |
| 1 | Introduction to Statistics | The basic concepts of statistics |
| 2 | Data Types and Data Gathering | Data Gathering |
| 3 | Spreadsheet macros and commands, Data Processing | Excel |
| 4 | Measures of central tendency and dispersion | Averages, Deviations |
| 5 | Survey of Probability Concepts | Probability |
| 6 | Binomial, Poisson and normal distributions | Probability Distributions |
| 7 | Advanced probability conceps. Bayes's Theorem | Probability Theory |
| 8 | **Mid-term Exam** |  |
| 9 | Random number generation and law of large numbers | Excel Macros |
| 10 | Sampling Theory | Probability |
| 11 | Covariance and Correlation | Elementary Math |
| 12 | Hypothesis Testing | Random Variables |
| 13 | One way analysis of variance | Probability Distributions |
| 14 | Linear Regression | Elementary math |
| 15 | Final Exam |  |

|  |  |
| --- | --- |
| **RECOMMENDED SOURCES** | |
| **Textbook** | Douglas A. Lind, William G. Marchal, Samuel A. WathenBasic Statistics for Business & Economics 8th Edition, Mc Graw Hill, ISBN 978-007-131807-5 |
| **Additional Resources** | Lecture notes, scientific calculator, spreadsheet |

|  |  |
| --- | --- |
| **MATERIAL SHARING** | |
| **Documents** | Guidelines and additional examples for Lecture Topics |
| **Assignments** | Homework Assignments |
| **Exams** | Midterm Exam and Final Exam |

|  |  |  |
| --- | --- | --- |
| **ASSESSMENT** | | |
| **IN-TERM STUDIES** | **NUMBER** | **PERCENTAGE** |
| Mid-terms | 1 | 40 |
| LAB AND Quizzes | 6 | 10 |
| Attendance | - | 0 |
| **Total** |  | **100** |
| **Contribution of Final Examination to Overall Grade** |  | 40 |
| **Contribution of In-Term Studies to Overall Grade** |  | 60 |
| **Total** |  | **100** |

|  |  |
| --- | --- |
| **COURSE CATEGORY** | Expertise/Field Courses |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **COURSE'S CONTRIBUTION TO PROGRAM** | | | | | | | | | | | | | |
| No | Program Learning Outcomes | | Contribution | | | | | | | | | | |
| 1 | | 2 | | 3 | 4 | | 5 | |  | |
| 1 | Software Developments graduates have the knowledge and the skills to design and develop the complete systems for multi-media visual user interface. | |  | |  | |  |  | |  | |  | |
| 2 | Software Developments graduates have advanced the knowledge and skills to design, develop and install the application systems for multi-media. | |  | |  | |  |  | |  | |  | |
| 3 | Software Developments graduates have the knowledge and the skills to design, develop and apply algorithms and data structures to solve the basic problems of information processing, within the framework of discrete mathematics. | |  | |  | |  |  | |  | | x | |
| 4 | Software Developments graduates have the knowledge and the skills to design and develop computer applications, based on user specified requirements, using modern structured development tools and install them on various hardware platforms and deploy their usage. | |  | |  | |  |  | |  | |  | |
| 5 | Software Developments graduates have the knowledge and the skills to design and develop computer applications, based on user specified requirements, using modern object-oriented development tools and install them on various hardware platforms and deploy their usage. | |  | |  | |  |  | |  | |  | |
| 6 | Software Developments graduates know the logic of computer operating systems, the basic set of system commands, how to control access to system resources by users of different departments and how to monitor the running of jobs in the system. | |  | |  | |  |  | |  | |  | |
| 7 | Software Developments graduates have the knowledge and the skills to design and develop data models serving different requirements, database applications that would access and process data using various types of software, including queries, reports and business applications. | |  | |  | |  |  | | x | |  | |
| 8 | Software Developments graduates have the knowledge and the skills to design and develop business applications that would provide data access, modification and processing for data kept in enterprise database systems. | |  | |  | |  | x | |  | |  | |
| 9 | Software Developments graduates have the knowledge about computer networks, and have  the skills to design,  develop and monitor  computer networks, how to configure them  and how to maintain their performance. | |  | |  | |  |  | |  | |  | |
| 10 | Software Developments graduates have the knowledge and the skills to design and develop visual user interfaces for the web, web-based applications for n-tier client/server configurations, how to deploy them in enterprises. | |  | |  | |  |  | |  | |  | |
| 11 | | Software Developments graduates,  within his/her job responsibilities can communicate the necessary information  both written and orally in Turkish, English and another foreign language, respecting the values the societal institutions and establishments, of which he/she has acquired in the program. | |  | |  | X | |  | |  | |  | |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION** | | | |
| Activities | Quantity | Duration (Hour) | Total Workload (Hour) |
| Course Duration (Including the exam week: 15x Total course hours) | 15 | 3 | 45 |
| Hours for off-the-classroom study (Pre-study, practice) | 15 | 3 | 45 |
| Mid-terms | 1 | 10 | 10 |
| Homework | 14 | 1 | 14 |
| Final examination | 1 | 10 | 10 |
| **Total Work Load** |  |  | 124 |
| **Total Work Load / 25 (h)** |  |  | 4,96 |
| **ECTS Credit of the Course** |  |  | 5 |

==================================================