



## COURSE INFORMATION FORM

Course Name	Course Code
STATISTICAL DATA ANALYSIS	151413562

Semester	Number of Course Hours per Week		ECTS
	Theory	Practice	
3	3	0	3

Course Category (Credit)				
Basic Sciences	Engineering Sciences	Design	General Education	Social
1	2			

Course Language	Course Level	Course Type
Turkish	Undergraduate	Elective

<b>Prerequisite(s) if any</b>	-
<b>Objectives of the Course</b>	The course aims to help students understand the fundamental concepts and algorithms of statistical data analysis and transform this knowledge into practical applications. It will equip students with the ability to perform data analyses using various regression techniques. Students will be able to apply data preprocessing, cleaning, and transformation techniques, and gain the ability to evaluate and improve model performance. They will also develop applications using the R programming language or different statistical software package
<b>Short Course Content</b>	This course covers the fundamental concepts and algorithms of data analysis. The content includes hypothesis testing concepts, data preprocessing techniques, linear regression, and advanced regression analyses. Additionally, methods for evaluating and improving model performance are taught through practical examples using the R programming language or statistical software packages.

Learning Outcomes of the Course	Contributed PO(s)	Teaching Methods *	Measuring Methods **
1 Learning the fundamentals of statistical data analysis	1,2,3,4,5,8	1,6,11	A,D,J
2 Understanding data processing and cleaning methods	1,2,3,4,5	1,6,11,12,15	A,D,J
3 Ability to model and analyze	1,2,3,4,5,8	1,6,11,12,15	A,D,J
4 Model evaluation and improvement	1,2,3,4,5	1,6,11,12,15	A,D,J
5 Ability to use programming languages and libraries	1,2,3,4,5,6,8,10	1,6,11,12,15	A,D,J
6 Gaining project management, teamwork, and presentation skills	6,7,8,9,10,11	2,12,13,14,15	A,D,J
7			
8			

\***Teaching Methods** 1:Expression, 2:Discussion, 3:Experiment, 4:Simulation, 5:Question-Answer, 6:Tutorial, 7:Observation, 8:Case Study, 9:Technical Visit, 10:Trouble/Problem Solving, 11:Individual Work, 12:Team/Group Work, 13:Brain Storm, 14:Project Design / Management, 15:Report Preparation and/or Presentation

\*\***Measuring Methods** A:Exam, B:Quiz, C:Oral Exam, D:Homework, E:Report, F:Article Examination, G:Presentation, I:Experimental Skill, J:Project Observation, K:Class Attendance; L:Jury Exam

<b>Main Textbook</b>	Lecture notes
<b>Supporting References</b>	Alpaydın E. (2014). Introduction to Machine Learning, Boğaziçi University, Publisher: The MIT Press, (Third Edition). Mitchell T. (2016). Machine Learning, Publisher: McGraw Hill, 1997 (First Edition). Hoaglin, D.C., Mosteller, F., Tukey, J.W. (1983). Understanding Robust and Exploratory Data Analysis, Wiley Tamhane, Ajit C., and Dorothy D. Dunlop. Statistics and Data Analysis: From Elementary to Intermediate. Prentice Hall, 1999. ISBN: 9780137444267. Rudin C., Chang A., Bisias D. (2011). Statistical Thinking And Data Analysis. MIT OpenCourseWare.
<b>Necessary Course Material</b>	Laptop or desktop computer, presentation/projector device, fixed/movable presentation screen, whiteboard.

<b>Course Schedule</b>	
<b>1</b>	Introduction to the course
<b>2</b>	Introduction to R programming language and SPSS
<b>3</b>	Fundamental Concepts in Statistics
<b>4</b>	Data collection and cleaning
<b>5</b>	Data exploration, processing, and sampling
<b>6</b>	Statistical Estimation and Hypothesis Testing
<b>7</b>	Simple and Partial Correlation
<b>8</b>	Mid-Term Exam
<b>9</b>	Introduction to linear regression analysis
<b>10</b>	Bivariate regression analysis
<b>11</b>	Multivariate regression analysis
<b>12</b>	Interpretation of model parameters
<b>13</b>	Regularization and variable selection methods
<b>14</b>	Evaluation of model performance
<b>15</b>	Selection of the optimal model
<b>16,17</b>	Final Exam

<b>Calculation of Course Workload</b>			
<b>Activities</b>	<b>Number</b>	<b>Time (Hour)</b>	<b>Total Workload (Hour)</b>
Course Time (number of course hours per week)	14	3	42
Classroom Studying Time (review, reinforcing, prestudy,...)	14	1	14
Homework	0	0	0
Quiz Exam	0	0	0
Studying for Quiz Exam	0	0	0
Oral exam	0	0	0
Studying for Oral Exam	0	0	0
Report (Preparation and presentation time included)	1	2	2
Project (Preparation and presentation time included)	0	0	0
Presentation (Preparation time included)	1	2	2
Mid-Term Exam	1	14	14
Studying for Mid-Term Exam	1	1	1
Final Exam	1	14	14
Studying for Final Exam	1	1	1
<b>Total workload</b>			<b>90</b>
<b>Total workload / 30</b>			<b>3</b>
<b>Course ECTS Credit</b>			<b>3</b>

Evaluation	
<b>Activity Type</b>	<b>%</b>
Mid-term	30
Quiz	30
<b>Final Exam</b>	40
<b>Total</b>	100

RELATIONSHIP BETWEEN THE COURSE LEARNING OUTCOMES AND THE PROGRAM OUTCOMES (PO) (5: Very high, 4: High, 3: Middle, 2: Low, 1: Very low)		
NO	PROGRAM OUTCOME	Contribution
1	Sufficient knowledge of engineering subjects related with mathematics, science and own branch; ability to apply theoretical and practical knowledge on solving and modeling of engineering problems.	4
2	Ability to determine, define, formulate and solve complex engineering problems; for that purpose an ability to select and use convenient analytical and experimental methods.	5
3	Ability to design a complex system under real life constrains or conditions, defined by environmental, economical and political problems; for that purpose an ability to apply modern design methods.	4
4	Ability to develop, select and use modern methods and tools required for engineering applications; ability to effective use of information technologies.	5
5	In order to investigate engineering problems; ability to set up and conduct experiments and ability to analyze and interpretation of experimental results.	4
6	Ability to work effectively in inner or multi-disciplinary teams; proficiency of interdependence.	4
7	Ability to communicate in written and oral forms in Turkish/English; proficiency at least one foreign language.	1
8	Awareness of life-long learning; ability to reach information; follow developments in science and technology and continuous self-improvement.	4
9	Understanding of professional and ethical issues and taking responsibility	1
10	Awareness of project, risk and change management; awareness of entrepreneurship, innovativeness and sustainable development.	2
11	Knowledge of actual problems and effects of engineering applications on health, environment and security in global and social scale; an awareness of juridical results of engineering solutions.	1

LECTUTER(S)			
<b>Prepared by</b>	Dr. Çağdaş KARA	Dr. Kadir Berkhan AKALIN	
<b>Signature(s)</b>			

**Date:**12/07/2024