

Management Information Systems			
Bachelor	TR-NQF-HE: Level 6	QF-EHEA: First Cycle	EQF-LLL: Level 6

## Course Introduction and Application Information

Course Code:	YBS209						
Course Name:	Introduction to Data Science						
Semester:	Fall						
Course Credits:	<table border="1"> <tr> <td>ECTS</td> </tr> <tr> <td>5</td> </tr> </table>			ECTS	5		
ECTS							
5							
Language of instruction:	Turkish						
Course Condition:							
Does the Course Require Work Experience?:	No						
Type of course:	Compulsory Courses						
Course Level:	<table border="1"> <tr> <td>Bachelor</td> <td>TR-NQF-HE:6. Master`s Degree</td> <td>QF- EHEA:First Cycle</td> <td>EQF-LLL:6. Master`s Degree</td> </tr> </table>			Bachelor	TR-NQF-HE:6. Master`s Degree	QF- EHEA:First Cycle	EQF-LLL:6. Master`s Degree
Bachelor	TR-NQF-HE:6. Master`s Degree	QF- EHEA:First Cycle	EQF-LLL:6. Master`s Degree				
Mode of Delivery:	Face to face						
Course Coordinator:	Doç. Dr. ŞEBNEM ÖZDEMİR						
Course Lecturer(s):	Şebnem Özdemir						
Course Assistants:							

## Course Objective and Content

Course Objectives:	To teach the basic subjects of statistics, which is the first and an important step of data science, to be applied with the help of a mathematical background and a data analysis language.
Course Content:	The relationship between data, information and knowledge, structural, semi-structural and nonstructured data, data sources, things to be considered in data collection, universe, sample, distribution concepts and its effects on the data set, R language and its detailed use, basic

statistical concepts, confidence intervals, correlations and types, Chi-square, t and F distributions, hypothesis tests, Chi-square based significance tests, simple and multiple regression, mathematical backgrounds and applications in R language

## Learning Outcomes

The students who have succeeded in this course;

- 1) Knows the difference between the concepts of data, information and knowledge and defines them with examples.
- 2) Know what structured data, nonstructured data and semi-structured data are.
- 3) Describes the steps in the process of collecting and organizing data.
- 4) Apply basic statistical analysis with the help of a data analysis language.
- 5) Performs a regression-based analysis on a data set and interprets the results obtained.

## Course Flow Plan

Week	Subject	Related Preparation
1)	Differences, similarities and methods in intersection sets between the concepts of data science, data mining, machine learning and artificial intelligence. Data, information, knowledge concepts.	
2)	Scope of data analysis, steps, tools used in the process. Introduction to R language (setting up R, community and Cran structure, advantages and disadvantages of RStudio, package and mirror selection, basic menus)	
3)	Basic operations with R language (calling default datasets in R, understanding the summary and data structure of a called data set, viewing certain rows and columns from the data)	
4)	R language and basic concepts (variables, operators, vectors, matrices, arrays, tables, basic loop and condition structures)	
5)	Basic operations with R language (creating own data set, printing / saving, recall, finding and recalling data set from internet, simple level graphics)	
6)	Data manipulation (data manipulation with default functions in R)	
7)	Data manipulation (data manipulation with commands in R packets - Tidyverse / Dplyr)	
8)	Basic descriptive statistics, hypothesis creation and confidence interval concepts, their application with R language	
9)	Correlation concept, its types and application with R language	
10)	Chi-square, t and F distributions, hypothesis tests, Chi-square based significance tests,	

	their application with R language	
11)	Chi-square, t and F distributions, hypothesis tests, Chi-square based significance tests, their application with R language	
12)	The Concept of Regression, simple regression and multiple regression, their application with the R language	
13)	The Concept of Regression, simple regression and multiple regression, their application with the R language	
14)	LDA and EDA, R language applications	
15)	LDA and EDA, R language applications	
16)	Final Exam Week	

## Sources

Course Notes / Textbooks:	<p>Illowsky, B.; Dean, S. (2018). Introductory Statistics, Rice University OpenStax, ISBN: 978-1-947172-05-0. <a href="https://d3bxy9euw4e147.cloudfront.net/oscms-prodcms/media/documents/IntroductoryStatistics-OP_i6tAl7e.pdf">https://d3bxy9euw4e147.cloudfront.net/oscms-prodcms/media/documents/IntroductoryStatistics-OP_i6tAl7e.pdf</a></p> <p>Büyüköztürk, Ş.; Çokluk, Ö.; Köklü, N. (2018). Sosyal Bilimler İçin İstatistik, Pegem Akademi, ISBN: 9789756802335.</p>
References:	<p>Özdemir, Ş. (2018). R Dili İle Veri Ön İşlemeden Model Seçimine Kadar Makine Öğrenmesi Süreci. BTK Akademi Eğitim Videoları. <a href="https://www.btkakademi.gov.tr/portal/course/r-dili-ile-veri-on-islemeden-model-secimine-kadar-makine-ogrenmesi-sureci-2305#!/about">https://www.btkakademi.gov.tr/portal/course/r-dili-ile-veri-on-islemeden-model-secimine-kadar-makine-ogrenmesi-sureci-2305#!/about</a></p> <p>Introduction to R, Datacamp.</p> <p>R Tutorial for Beginners: Learn R Programming Language, Guru99. <a href="https://www.guru99.com/r-tutorial.html">https://www.guru99.com/r-tutorial.html</a></p>

## Course - Program Learning Outcome Relationship

Course Learning Outcomes	1	2	3	4	5
Program Outcomes					
1) It has a wide range of interdisciplinary approaches to management information systems, primarily business and computer engineering.					
2) Comprehends the management information systems in terms of technical, organizational and managerial aspects and uses the current programming language by knowing the logic of programming.					
3) Uses different information technologies and systems for understanding and					

solving various business problems. <b>Course Learning Outcomes</b>	1	2	3	4	5
4) Interpret the data, concepts and ideas in the field of management information systems with scientific and technological methods.					
5) Analyze the needs for an information system and analyze the processes of analysis, design and implementation of the database.					
6) Gains technical and managerial contributions to IT projects and takes responsibility.					
7) Solve complex business and informatics problems by using various statistical techniques and numerical methods and make analyzes using statistical programs effectively.					
8) Uses a foreign language at the B1 General Level in terms of European Language Portfolio criteria according to the level of education.					
9) Develops teamwork, negotiation, leadership and entrepreneurship skills.					
10) Has universal ethical values, social responsibility awareness and sufficient legal knowledge.					
11) Develops positive attitudes related to lifelong learning and identifies individual learning needs and carries out studies to correct them.					
12) Students will be able to communicate their ideas and solutions both written and orally, and present and publish them on both national and international platforms.					
13) It uses information and communication technologies together with computer software at the advanced level of European Computer Driving License required by the field.					

### Course - Learning Outcome Relationship

No Effect	1 Lowest	2 Average	3 Highest

	Program Outcomes	Level of Contribution
1)	It has a wide range of interdisciplinary approaches to management information systems, primarily business and computer engineering.	3
2)	Comprehends the management information systems in terms of technical, organizational and managerial aspects and uses the current programming language by knowing the logic	3

	of programming.	
3)	Uses different information technologies and systems for understanding and solving various business problems.	2
4)	Interpret the data, concepts and ideas in the field of management information systems with scientific and technological methods.	1
5)	Analyze the needs for an information system and analyze the processes of analysis, design and implementation of the database.	1
6)	Gains technical and managerial contributions to IT projects and takes responsibility.	2
7)	Solve complex business and informatics problems by using various statistical techniques and numerical methods and make analyzes using statistical programs effectively.	2
8)	Uses a foreign language at the B1 General Level in terms of European Language Portfolio criteria according to the level of education.	1
9)	Develops teamwork, negotiation, leadership and entrepreneurship skills.	1
10)	Has universal ethical values, social responsibility awareness and sufficient legal knowledge.	1
11)	Develops positive attitudes related to lifelong learning and identifies individual learning needs and carries out studies to correct them.	1
12)	Students will be able to communicate their ideas and solutions both written and orally, and present and publish them on both national and international platforms.	1
13)	It uses information and communication technologies together with computer software at the advanced level of European Computer Driving License required by the field.	1

## Assessment & Grading

Semester Requirements	Number of Activities	Level of Contribution
Attendance	1	% 10
Quizzes	2	% 10
Midterms	1	% 35
Final	1	% 45
<b>total</b>		<b>% 100</b>
PERCENTAGE OF SEMESTER WORK		% 55

PERCENTAGE OF FINAL WORK	% 45
<b>total</b>	<b>% 100</b>

### Workload and ECTS Credit Calculation

Activities	Number of Activities	Preparation for the Activity	Spent for the Activity Itself	Completing the Activity Requirements	Workload
Course Hours	14	1	2		42
Study Hours Out of Class	14	2	1		42
Quizzes	3	2	1		9
Midterms	1	10	1		11
Final	1	15	2		17
<b>Total Workload</b>					<b>121</b>