<table>
<tr><th colspan="2">COURSE DESCRIPTION FORM</th></tr>
<tr><td>Course Code and Name</td><td>CENG313 INTRODUCTION TO DATA SCIENCE</td></tr>
<tr><td>Course Semester</td><td>8</td></tr>
<tr><td>Catalog Content</td><td>Data science pipeline, data analysis tools, data visualization, data types, data transformations, operations on data tables, data preprocessing, attribute analysis, dimension reduction, statistics, supervised and unsupervised learning.</td></tr>
<tr><td>Textbook</td><td>Data Science, John D. Kelleher, Brendan Tierney, The MIT Press, 2018.</td></tr>
<tr><td>Supplementary Textbooks</td><td>The Data Science Handbook, Field Cady, Wiley, 2017.</td></tr>
<tr><td>Credit</td><td>3</td></tr>
<tr><td>Prerequisites of the Course
(Attendance Requirements)</td><td>-</td></tr>
<tr><td>Type of the Course</td><td>Compulsory</td></tr>
<tr><td>Instruction Language</td><td>English</td></tr>
<tr><td>Course Objectives</td><td>To have theoretical and practical knowledge on data types and metrics, pipeline in data science, data modelling, data visualization. To gain experience in the libraries required for data analysis and to develop sample applications in data science.</td></tr>
<tr><td>Course Learning Outcomes</td><td>1. Understanding the general workflow in data science activities.
2. Performing data analysis tools, data visualization, data types, transformations between types.
3. Having knowledge about data preprocessing.
4. Learning one of the feature analysis, dimension reduction techniques.
5. Gaining knowledge about statistical approaches and supervised and unsupervised learning.
6. Using data science libraries within the scope of homework.</td></tr>
<tr><td>Instruction Methods</td><td>The mode of delivery of this course is face to face.</td></tr>
<tr><td>Weekly Schedule</td><td>1.Week: Introduction to data science
2.Week: General pipeline in data science
3.Week: Data analysis tools, data visualization
4.Week: Data types and data transformations
5.Week: Operations on data tables
6.Week: Data preprocessing
7.Week: Feature analysis and dimension reduction
8.Week: Statistical learning
9.Week: Supervised learning: regression
10.Week: Supervised learning: classification, nearest neighbor algorithm
11.Week: Supervised learning: classification, decision trees
12.Week: Supervised learning: classification, performance metrics
13.Week: Unsupervised learning: partitioning and density-based clustering
14.Week: Unsupervised learning: hierarchical clustering</td></tr>
<tr><td>Teaching and Learning Methods
(These are examples. Please fill which activities you use in the course)</td><td>Weekly theoretical course hours
Internet search and library work
Designing and implementing materials
Midterm and revision for midterm
Final Exam and Preparation for Final Exam</td></tr>
<tr><td>Assessment Criteria</td><td>
<table>
<tr><th></th><th>Number(s)</th><th>Weight (%)</th></tr>
<tr><td>Midterm exam</td><td>1</td><td>40</td></tr>
<tr><td>Assignment</td><td>2</td><td>20</td></tr>
<tr><td>Application</td><td></td><td></td></tr>
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Project			
Practice			
Quiz			
Final exam	1	40	
Total	3	100	

Workload

Activity	Number of Weeks	Duration (Weekly Hour)	End of Semester Total Workload
Weekly theoretical course hours	14	3	42
Weekly practical course hours	0	0	0
Reading activities	0	0	0
Internet search and library work	5	2	10
Designing and implementing materials	2	5	10
Making a report	0	0	0
Preparing and making presentations	0	0	0
Midterm and revision for midterm	1	5	5
Final exam and revision for final exam	1	8	8
Total workload			75
Total workload/ 25			3
Course Credit (ECTS)			3

Contribution Level Between Course Learning Outcomes and Program Outcomes

No	Program Outcomes	1	2	3	4	5
1	Knowledge of mathematics, science, basic engineering, computing, and computer engineering; ability to use this knowledge in solving complex engineering problems.			x		
2	Ability to define, formulate and analyze complex engineering problems using basic science, mathematics and engineering knowledge and considering the UN Sustainable Development Goals relevant to the problems addressed.			x		
3	Ability to design creative solutions to complex engineering problems; ability to design complex systems, processes, devices, software, algorithms or products to meet current and future requirements, considering realistic constraints and conditions.			x		
4	Ability to select, use and develop appropriate techniques, resources and modern engineering and informatics tools, including estimation and modeling, for the analysis and solution of complex engineering problems while being aware of their limitations.				x	
5	Ability to use research methods to examine complex engineering problems or research topics in computer engineering, including reviewing the literature, designing experiments, conducting experiments, collecting data, analyzing and interpreting results.				x	
6	Knowledge of the effects of engineering practices and the standards used in these practices on society, health and safety, economy, sustainability and environment					

	within the scope of the UN Sustainable Development Goals; awareness of the consequences of engineering solutions in the fields of information security and law.						
7	Acting in accordance with engineering professional principles and knowledge on ethical responsibility; awareness of acting impartially, without discrimination on any issue, and being inclusive of diversity.		x				
8	Ability to work effectively individually and as a team member or leader in intradisciplinary and multidisciplinary teams (face-to-face, remote, or hybrid).				x		
9	Ability to conduct effective verbal and written communication on technical issues in Turkish or English, prepare reports, make effective presentations and prepare software documentation, considering the various differences of the target audience (such as education, language, profession).		x				
10	Knowledge of business practices such as project, risk and change management and economic feasibility analysis; awareness of entrepreneurship and innovation.						
11	Lifelong learning skill that includes the ability to learn independently and continuously, to adapt to new and developing scientific practices and technologies, and to think inquisitively about technological changes.		x				

The Course's Lecturer(s) and Contact Information	Assist. Prof. Dr. Ceren Güzel Turhan cerenguzel@gazi.edu.tr