FACULTY OF ECONOMICS, ADMINISTRATIVE AND SOCIAL SCIENCES
Economics Program

INTRODUCTION TO APPLIED DATA SCIENCE
Syllabus Spring 2026 - ABU

1. COURSE

Introduction to Applied Data Science
Credits: 3 (T)
Semester: Spring (2025-2026)
Prerequisites: Statistics I
Classroom: TBA
Date and time: Wednesday _____

2. INSTRUCTOR

Prof. Dr. Nilufer Kahraman
Email:
Course web page: https://www.niluferkahraman.com/introtoapplieddatascience
Office: TBA
Office Hours: TBA
Course assistant: TBA
Email: TBA

3. CONTENT

This course provides students with an introduction to the fundamentals of applied data science for the behavioral and social sciences. Students will gain exposure to methods, and technologies and will learn how to organize, manage, clean, process, and analyze data. Core themes include data management practices, ethics, data quality control, and the communication of insights for effective decision-making. Through a combination of lectures, individual assignments and a group project, students will develop hands-on skills in R programming and applied statistics, while exploring advanced topics such as data visualization, text mining, and machine learning.

This course is a broad survey of open science and reproducible code, effective data management and visualization, application of machine learning and predictive modeling (e.g., classification, regression, regularization, neural networks), unsupervised learning (e.g., k-means clustering, exploratory graph analysis), and cross-validation for generalizability. Experience with R is helpful but not necessary.

Weekly tasks reinforce lecture concepts, giving students opportunities to practice coding, transform and clean data, and conduct real-world analyses. The semester culminates in a final project where students apply what they have learned to analyze a real-world dataset and deliver actionable insights.

4. BOOKS AND OTHER OPEN SOUCE MATERIALS

4.1. Github open source course materials

Alexander Christensen
https://github.com/AlexChristensen/PSY-GS-8875_Behavioral-Data-Science

Lesley Cordero and ADI
https://github.com/oldclesleycode/data-science-r

David Garcia
https://github.com/dgarcia-eu/SocialDataScience

4.2. Additional materials

Saltz, J. S., & Stanton, J. M. (2017). An introduction to data science. Sage Publications.

4.3. Software: R-Studio
R is an open-source software for statistical computing and graphics.
https://www.r-project.org/
We will be using R-studio interface. R studio should be downloaded after R.
https://www.rstudio.com/products/RStudio/

4.4. Other materials
https://www.niluferkahraman.com/introtoapplieddatascience

5. COURSE OBJECTIVES AND EXPECTATIONS

5.1. Objectives: student can
- Understand basic concepts related to data science field
- Understand basic concepts related to descriptive and predictive models
- Apply tools from data science to understand phenomena
- Produce code and scripts
- Apply code and scripts to compute basic regression or other predictive models
- Communicate constructs, processes and findings produced by data science.

5.2. Expectations

The primary goal of this course is to build practical, hands-on data science skills. Students are expected to actively engage with the material, which includes weekly readings, coding assignments, and in-class discussions. Since this is an applied course, a significant portion of learning will happen through practice in R. You are expected to install the necessary software by the first week and complete weekly tasks diligently. Regular participation is crucial for success and will contribute to your understanding. It is also highly recommended that you begin thinking about potential datasets for your final project early in the semester.

5.3. Technological Requirements
- To have knowledge of basic computer hardware and be able to use input/output devices
- Basic word processing, spreadsheet, and data presentation skills
- Basic knowledge and skills in Internet usage

6. TEACHING AND LEARNING METHODS

6.1. Delivery Methods
In addition to in-class meetings, online discussion and sharing tools will be used in the course.

6.2. Teaching Approach
Active learning strategies are planned to develop students' multifaceted thinking models, creativity, and critical thinking skills. In this course, grading will not be based on memorized information, but rather on the knowledge and applications that students have internalized, made sense of, and structured logically.

6.3. Course Interaction
- Face-to-face interaction in the classroom
- Email
- Website

6.4. Feedback
- Feedback on assignments
- Midterm exam evaluation
- Final exam evaluation
- Project evaluation

7. COURSE POLICIES

7.1. Class Participation: Due to the structure of the course, it is important for students to participate by sharing information and ideas and to complete the computer applications. This type of participation will be considered for bonus points.

7.2. Assignment/Project Submission Procedure: Assignments requested electronically will be sent via email or CD; printed assignments will be submitted in person.

7.3. Make-up Exams: Students who can prove an excuse accepted by the Faculty Administrative Board with the necessary documentation may take a make-up exam on a date to be announced by the department.

7.4. **Bonus Points**: Positive participation in the course, both in-class and online, beyond the standard course requirements will be considered for bonus points.

7.5. Internet Usage Etiquette (Netiquette): http://www.meb.gov.tr/duyurular/duyurular/internetEtigi/intEtik.htm

7.6. Attendance: In cases of extraordinary circumstances, the relevant regulations of the Antalya Bilim University will be followed.

8. EVALUATION AND GRADING

GRADE	MARKS	GRADE	MARKS
A+	-	C+	60-64
B+	80-84	D+	45-49
B	75-79	D	40-44
B-	65-74	F	0-39

Evaluation Methods*	Description	Percentage	Total
Midterm Assessment	Written Assignment (Portfolio) or Exam	40%	40
Final Assessment	Written Report or Exam	60%	60
Bonus Points	Presentations	Up to 5 pts	
Total Score		100%	100

9. COURSE SCHEDULE

WEEK	TOPICS	Material and assignments
1-2	What is social data science	Read Saltz & Stanton Ch. 1-2. **Install R and RStudio.**
3	Introduction to R and RStudio	**Assignment 1:** Complete introductory tutorial (e.g., swirl).
4	Machine learning: Data Wrangling	Installing packages, importing and cleaning data.
5	Big data: Data Visualizatio	Working with libraries (ggplot2) to create graphs. **Assignment 2 Due.**
6-7	Google trends data	APIs, factors, corpus, bias, variance.
8	Social network data	Introduction to network analysis. **Final Project Proposal Due**
9	Natural language processing	Basics of text mining and sentiment analysis.
10	MIDTERM	**Midterm Exam / Portfolio Submission**
11	Machine learning prediction	Supervised learning: Regression and classification models.
12	Random forest	Unsupervised learning and ensemble methods. **Assignment 3 Due.**
13	Student Presentations	In-class presentations of final projects (Part 1).
14	Student Presentations	In-class presentations of final projects (Part 2).
15	FINAL EXAM	**Final Project Report Due.**

Please note that this schedule is tentative and may be adjusted during the semester; an announcement will be made in the event of any changes.

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Course Code	Course Name	Course Type	Weekly Course Hours			Credit	ECTS
			T	P	L		
3162	Introduction to Applied Data Science					3	5
Course Year/Semester	2026/Spring						
Prerequisites		**Prerequisite Courses**	Statistics I				
Language of Instruction	English						
Instructor	Prof. Dr. Nilufer Kahraman	**Office Hours**					
E-Mail							
Phone Number		**Office Number**					
Teaching Assistants		**E-Mail**					
Course Description/Objectives:	This course is a broad survey of open science and reproducible code, effective data management and visualization, application of machine learning and predictive modeling (e.g., classification, regression, neural networks), unsupervised learning (e.g., k-means clustering, exploratory graph analysis), and cross-validation for generalizability. Students will gain exposure to methods, and technologies and will learn how to organize, manage, clean, process, and analyze data.						
Learning Outcomes	• Understand basic concepts related to data science field • Understand basic concepts related to descriptive and predictive models • Produce code and scripts in R for data analysis. • Apply code and scripts to compute basic regression or predictive models • Communicate processes and findings produced by data science.						