

ED 501 - STATISTICS

Fall, 2026

Instructor

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Office Hours: Tuesday, 15.00-16.00

Course Description

Location: TBA

Time: TT ThTh 12 78

This course includes training on how to use the open-source R programming language to analyze data collected through quantitative research designs. The course begins with an introduction to the basic principles of the R programming language and continues with applications of t-tests, ANOVA, correlation, and linear regression, which are frequently used in educational research. Finally, the course covers data wrangling, visualizations, and reproducibility practices required in quantitative data analysis. **Participants do not have to develop R skills. The instructor will introduce the topic and run the analyses using R but will re-do the analyses using SPSS and Jamovi.**

Course Materials

This course does not require a specific course material. However, participants **have to declare at least one** resource as their main reference for their final project. Among many materials the instructor is familiar with:

(SARP) Aydın Burak, Algina James, Leite Walter L, Atılgan Hakan, (2017) *An R Platform for Social Scientists*. <https://burakaydin.github.io/SARP-EN/book/>

(Hadley) *R for Data Science* (ücretsiz erişim <https://r4ds.hadley.nz/>)

(Meier) <https://stat.ethz.ch/~meier/teaching/anova/split-plot-designs.html>

(Revelle) <https://www.personality-project.org/r/book/>

(Bean) https://bookdown.org/bean_jerry/using_r_for_social_work_research/structural-equation-modeling.html

Field, A. P., Miles, J., & Field, Z. (2023). *Discovering statistics using R*.

Course Objectives

At the end of this course, the students are expected to analyze and produce necessary visualizations of the data collected with

1. Designs comparing the two means
2. Basic designs to compare more than two means
3. Designs investigating the linear relationship between two variables
4. Designs with one dependent and multiple independent continuous variables

TENTATIVE COURSE SCHEDULE

Week	Topic	Main Reference	Assignment	Scoring
1	Introduction			
2	Functions, data processing, descriptive statistics, and correlation in R	SARP-1,2,3,4,5,6,7 ve 10	A1: Find an empirical dataset containing at least 3 continuous and 3 categorical variables (repeated measures are recommended).	0: None 1: Flawed 2: Adequate
3	Comparison of independent means: t-test, one-way ANOVA, analysis of covariance.	SARP-8.1, 9.1, 9.2 Boomsma	A2: Calculate descriptive statistics and correlations for your own dataset.	0: None 1: Flawed 2: Adequate
4	Comparison of non-independent means: t-test, one-way ANOVA, MANOVA.	SARP- 8.2, 9.3 Manova_example.R	A3-5: Independent samples t-test, one-way ANOVA, and analysis of covariance (preferably using your own dataset)	0: None 3 X 1: Flawed 2: Adequate
5	Mixed ANOVA or split-plot.	Meier 8	A6-8: Paired-samples t-test, one-way ANOVA, and MANOVA analyses, preferably using your own dataset.	0: None 3 X 1: Flawed 2: Adequate
6	Predictor selection and joint effects in multiple regression with continuous variables.	SARP 11	A9: Mixed-design ANOVA analysis, preferably using your own dataset.	0: None 2: Flawed 4: Adequate
7	Regression for categorical dependent variables	Revelle	Preparing for the midterm exam and final project.	
8	Midterm			I will share the rubric.
9	Introduction to structural equation modeling	Bean	Preparing for the final project	
10	Visualization, data simulation, and reproducible analyses with R	Hadley 2 ve Burak	Preparing for the final project	
11	Project presentations			
12	Project presentations			

Grading

Activity	Count	Weight
Assignment	9	20
Midterm	1	30
Project	1	50
Total		100

100-90: AA

89-85: BA

84-80: BB

79-75: CB 74-70: CC

69-65: DC

64-60: DD

Below 60: F

No submission or a submission more than 1 week late will receive a 0.

Course Requirements:

Attendance is critical to your success. Although students are not required to attend all of the class sessions, they are responsible for completing all phases described above. Attendance will be tracked, and department regulations will be followed to assign an F to students who are frequently absent.

Assignments: A reproducible R code/SPSS syntax and a short paragraph to explain results are expected

The midterm is a 10-item short-answer in-class exam.

The final project: A professional methods section (see articles published in top-tier journals) with reproducible syntax/code. The recommended word limits are 3000 to 5000.

CLASS POLICIES

Announcements and Communication: The main channel will be Moodle.

Written Assignment Format: All written assignments should be double-spaced in 12-point font (Times New Roman, Calibri or Arial) and adhere to page requirements listed in Moodle. All citations and references must follow APA formatting guidelines. APA style help: <http://www.apastyle.org/> or <http://owl.english.purdue.edu/owl/resource/560/01/>. More details about APA and its simplified use for the class will be provided. Submit all assignments through Moodle. When submitting assignments, please save the work as .doc, .docx, or PDF file format. Keep all assignment files until you receive your final grade at the end of the semester. In addition, on every written assignment, list your name, surname, student ID, and department on the first page, along with the title and date. Also include your name in the header at the top of every page to indicate full responsibility for each page.

Class Protocol: Please be respectful of your peers' learning environment and stay engaged in class discussion. Please silence all cell phones and put them away during class time. Please do not engage in unrelated chats with classmates during class time.

Academic Integrity: Plagiarism is the representation of another's work or ideas as one's own, whether deliberate or unintentional. It includes unacknowledged word-for-word use (more than five words in a row without quotes or citation) and/or paraphrasing of another person's work, and/or the inappropriate unacknowledged use of another's ideas. If plagiarism has occurred, the student's work will receive an automatic grade of 0. If you have any questions, please do not hesitate to ask. Beware: plagiarism is easy to commit with the Internet at our fingertips.

Success as a Student: I recognize students often balance many challenging personal issues and demands. Please visit during office hours; we can check together whether the University provides any support.

Policy Statement of Equal Treatment and Disabilities: The instructor and students in this course will act with integrity and strive to engage in equitable verbal and non-verbal behavior with respect to differences arising from age, gender, race, physical ability, and religious preferences.

Use of AI: AI tools are allowed in this course, as long as their use is transparent and properly cited. You may use AI tools to support your research, drafting, and editing. However, AI cannot take the place of you as the author of your work. Your assignments must show your own thinking, ideas, analysis, and academic judgment. You are responsible for the accuracy, originality, and overall quality of everything you submit. If you use AI at any point, you must acknowledge it in your assignment (for example: "*Portions of this work were assisted by [tool name], [date used]*"). Submitting work that is mostly written by AI or presenting AI-generated content as your own is considered academic dishonesty and may be treated as plagiarism. To help ensure appropriate use of AI, your instructor may ask to see drafts, revision history, or the prompts and text you entered into an AI tool. This is to better understand your writing process, not to penalize responsible AI use. If you use AI for an assignment, you are responsible for saving and keeping a record of your AI use (such as prompts, outputs, or revision history) for that assignment.

Department Policies:

Midterm Re-sit: Midterm may be missed only in cases of documented emergency or illness. You must provide appropriate documentation (e.g., proof of a family emergency or a verified medical excuse). Failure to do so will result in a grade of zero for the midterm.

Sexual Harassment: Harassment undermines the learning community. Academic freedom, creativity, professional achievement, and personal development can only thrive in a safe and respectful environment. Such an environment requires that all faculty, staff, and students work free from coercion, intimidation, and exploitation. Harassment is contrary to the university's mission, and violations of this policy will result in disciplinary action, up to and including expulsion or termination. For further information, please visit the website of the Commission on Preventing Sexual Harassment (CİTÖK) at <https://citok.bogazici.edu.tr/>

This syllabus WILL adapt and shift during the semester in accordance with class advancement and interests. You will be informed of any modifications as they happen.