

Identification	Subject	Research Analytics	
	Department	Computer Science	
	Program (Undergraduate, Graduate)	Graduate (Master's)	
	Term	Fall 2026	
	Instructor	Beyza Aksu Dünya	
	Email:	beyza.aksu@khazar.org	
	Classroom/hours	Friday, 18:40 - Online	
Language	English		
Compulsory/ Elective	Compulsory		
Textbooks and course materials	• Instructor-prepared course notes, selected research articles, and weekly datasets.		
Course description	This graduate course introduces research analytics as an applied workflow for turning research data and evidence into credible, interpretable, and useful insights. Building on prior coursework in Research Methods, the course emphasizes data quality, preparation, exploratory analysis, visualization, literature analytics, open and secondary data, text and qualitative data, digital trace data, dashboards, AI-assisted analytics, reproducibility, and responsible data use. The course is not designed as an advanced statistics course; statistical concepts are used only when they support sound analytical reasoning and interpretation.		
Course objectives	By the end of the course, students will: 1. Understand the role of research analytics within the broader research process. 2. Develop practical skills for evaluating, cleaning, organizing, and documenting research data. 3. Use exploratory analysis and visualization to identify and communicate patterns in data. 4. Work with multiple forms of research evidence, including open, secondary, text, qualitative, and digital trace data. 5. Use digital and AI-supported tools critically, transparently, and responsibly. 6. Build reproducible analytical workflows and communicate findings to academic and professional audiences.		
Learning Outcomes	Upon successful completion of this course, students will be able to: 1. Translate a research question into an appropriate analytics workflow. 2. Assess the relevance, quality, structure, and limitations of research datasets. 3. Clean, transform, and document data using reproducible procedures. 4. Conduct exploratory analysis and distinguish meaningful patterns from misleading or unsupported interpretations. 5. Design clear and ethical research visualizations and simple dashboards. 6. Conduct introductory analytics with literature, text, qualitative, and digital trace data. 7. Critically evaluate open and secondary data sources for research use. 8. Use generative AI as an analytics support tool while verifying outputs and documenting its use. 9. Apply principles of reproducibility, privacy, fairness, and responsible research analytics. 10. Communicate analytical findings, limitations, and decisions clearly.		
Teaching methods	Case analysis		X
	Group discussion		X
	Lecture		X
	Data analysis		X
Evaluation Criteria	Methods	Date/deadlines	Percentage (%)
	Midterm (Applied Analytics Task)	Mid-semester / TBA	30
	Activity	Weekly / throughout the semester	10
	Attendance	Weekly	10
	Final Exam		50
	Total		100
Class Policy	Communication: Students may contact the instructor by email about course content, activities, or expectations. Online participation: Classes meet online on Fridays at 18:40. Students are expected to join on time and participate in discussions and in-class analytics activities. Activities: Short applied activities will be assigned throughout the semester and together constitute 10% of the course grade. Attendance: Attendance and regular participation constitute 10% of the course grade. Academic integrity and AI use: Students are responsible for the accuracy and originality of submitted work. AI may be used when permitted, but its use must be transparent and all outputs must be verified. Fabricated data, references, analyses, or results are not acceptable. Materials: Students are responsible for checking the course platform for readings, datasets, announcements, and activity instructions.		
AI Policy	GAI tools may be used only in the following cases: (1) during the stage of developing the project structure, (2) for checking the syntax of program code, (3) for grammatical editing of the text, etc. The content of the written report, the analysis of data, and the interpretation of results must be prepared independently by the student in full. The use of GAI in the preparation of presentations is not permitted.		

Tentative Schedule			
Week	Date/Day (tentative)	Topics	Textbook/Assignments
1	Friday	Introduction to Research Analytics • What research analytics is and how it differs from research methods and statistics • Descriptive, diagnostic, predictive, and decision-oriented analytics • The research analytics workflow	Activity: Map a research question to an analytics workflow
2	Friday	Introduction to Scientific Research • Purpose of research in graduate studies • Types of research: basic, applied, evaluation Identifying Research Problems • Sources of research problems • Problem statements • Research questions and objectives • Conceptual vs operational definitions	Activity: Proposing research problems
3	Friday	Literature Review • Searching academic databases • Evaluating sources • Organizing literature	Activity: Searching the literature
4	Friday	Research Designs Overview • Experimental • Quasi-experimental • Non-experimental (survey, correlational) Design selection criteria	Activity: Exploring existing studies
5	Friday	Variables and Measurement • Types of variables • Measurement scales • Indicators and operationalization Measurement error	Activity: Identifying variables in a scientific paper
6	Friday	Instrument Development • Test and questionnaire design • Rating scales Pilot testing	Activity: Mock design
7	Friday	Reliability • Internal consistency • Inter-rater reliability • Test-retest Interpretation of reliability coefficients	Activity: Dataset reliability evaluation
8	Friday	Validity • Content validity • Construct validity • Criterion validity Threats to validity	Evolving conceptions of validity
9	Friday	Data Collection and Sampling • Sampling methods • Sample size considerations • Ethical data collection Data management	Activity: Sampling exercise
10	Friday	Descriptive Statistics • Central tendency and variability • Data visualization • Distribution characteristics Outliers	Activity: Data analysis
11	Friday	Inferential Statistics I • Hypothesis testing • p-values and confidence intervals • Effect size Practical vs statistical significance	Activity: Data analysis
12	Friday	Qualitative and Mixed Methods • Interviews and open-ended data • Coding and thematic analysis When to use mixed methods	Activity: Data analysis
13	Friday	Research Ethics and Reproducibility • Ethics approval and informed consent • Data privacy and responsible research • Transparency and reproducibility • Avoiding bias	Activity: Reproducibility checklist

14	Friday	Ethics, Bias, Privacy, and Responsible Analytics • Data privacy and consent • Bias and fairness • Responsible AI and digital-data use • Ethical reporting	Activity: Ethics/bias case discussion
15	Friday	Integration and Research Analytics Presentations • Presentation of selected student activities/projects • Peer feedback and reflection	Activity: Integrated analytics presentation / portfolio reflection