Detailed Course Syllabus

Academic Year		2023/2024	Semester		Summer
Study Program	Graduate University Studies	**Specialization / Major in** Communication Sciences, Psychology, Sociology, History	**Year of Study**		1-2

11/I. BASIC COURSE INFORMATION

Name	Multivariate statistical methods			
Abbreviation	IZBD252	**Code**		252578
Status	Elective	**ECTS**		6
Prerequisites only for Croatian students	Introduction to Statistics			

Total Course Workload

Teaching Mode	Total Hours	Teaching Mode	Total Hours
Lectures	30	Practical	30
Class Time and Place		According to the published schedule	

II. TEACHING STAFF

Course Holder

Name and Surname	Luka Sikic		
Academic Degree	Phd	**Professional Title**	Assistant professor
Contact **E-mail**	luka.sikic@unicath.hr	**Telephone**	+385 (1)
Office Hours			

III. DETAILED COURSE INFORMATION

Teaching Language English

Course Description

Course Objectives:

This course covers advanced empirical research design, including developing questions, creating hypotheses, designing research, and analyzing data. Students will gain hands-on experience using statistical software and learn to properly analyze data using appropriate

statistical tests. The course will also cover effective communication of experimental findings, helping students develop skills to communicate their research findings to different audiences effectively. By the end of the course, students should be able to design and conduct their experiments and analyze the data they collect using statistical techniques appropriate for their research questions. They should also effectively communicate their experimental findings to scientific audiences. This will allow them to stay up-to-date with the course content and participate in scientific discussions.

In addition to attending lectures and seminars, students will be required to complete a data analysis project, which will be presented as an oral seminar presentation. This project will allow students to apply the data science skills they have learned to a real-world social science research problem. To complete the course, students must accumulate at least 70% of their grade through class activities, including midterm exams and written and orally presented seminar projects. This will ensure that students regularly engage with the course content and actively work towards mastering the skills and concepts covered in the course.

Course Content:

Introduction to Modern data. Introduction to programming language for statistics. Statistics refresher. Exploratory Data Analysis (Principal Component Analysis, Factor Analysis, Cluster Analysis). Confirmatory Data Analysis (Multiple Linear Regression, Survival Analysis, Basics of Machine Learning, Network Analysis, Time Series Analysis, Text Analysis, Basics of Natural Languange Processing). Empirical Project.

Expected Educational Outcomes	1. Develop a thorough understanding of multivariate statistical techniques, including their theoretical foundations and practical applications. 2. Learn to apply multivariate statistical techniques to real-world data analysis problems and research questions. 3. Understand the assumptions underlying multivariate statistical methods and how to assess their validity. 4. Gain experience in using statistical software to analyze multivariate data. 5. Develop skills in interpreting and presenting results of multivariate statistical analyses to various audiences.

Textbooks and Materials

Required	Hair Jr., J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). Multivariate Data Analysis. Pearson. Stevens, J. P. (2009). Applied Multivariate Statistics for the Social Sciences. Routledge.
Supplementary	Izenman, A. J. (2013). Modern Multivariate Statistical Techniques: Regression, Classification, and Manifold Learning. Springer. Sharma, S. (1996). Applied Multivariate Techniques. John Wiley & Sons. Bartholomew, D. J., & Steele, F. (2008). The Analysis of Multivariate Social Science Data. CRC Press.

Examination and Grading

To Be Passed	Yes	Exclusively Continuous Assessment	No	Included in Average Grade	Yes

Prerequisites to Obtain Signature and Take Final Exam	Attendance is crucial for success in this course, and students are expected to attend at least 70% of lectures and seminar sessions.
Examination Manner	Class activities: Midterm exam (written), seminar presentation (written and oral) and final exam.

Grading Manner

Final course grade is based on 100 points earned through student's continuous involvement in class activities:
Fair (2) – 50 to 64 points
Good (3) – 65 to 79 points
Very good (4) – 80 to 89 points
Excellent (5) – 90 to 100 points
Earning credits:
Class activities contribute to 50% of the grade:
Seminar – maximum 40 points
Seminar presentation – maximum 10 points
Final exam contributes to 50% of the grade:
Final exam – maximum of 50 points (50% of correct answers necessary for passing)

	Activity	ECTS points	Grade share(%)
Detailed Overview of Grading within ECTS	Attending	1.5	0
	Midterm exam	1.8	40
	Seminar written	0.9	20
	Seminar presented	0.45	10
	TOTAL CLASSES	4.65	70
	Final exam	1.35	30
	TOTAL	6	100

Midterm Exam Dates	The first exam in the 7th week of the course and the second exam in the 15th week.
Final Exam Dates	According to the official schedule.

IV. WEEKLY CLASS SCHEDULE

Lectures

Week	Topic
1.	Overview of the Course and Student Obligations
2.	Fundamentals of the R Programming Language
3.	Descriptive Statistics Refresher
4.	Inferential Statistics Refresher
5.	Principal Component Analysis (PCA)
6.	Factor Analysis
7.	Cluster Analysis
8.	Multivariate Regression Analysis
9.	Content (text) Analysis
10.	Survival Analysis
11.	Network Analysis
12.	Time Series Analysis
13.	Machine Learning
14.	Conducting Empirical Research
15	Final exam

Seminars

Week	Topic
1.	Overview of the Course and Student Obligations
2.	Fundamentals of the R Programming Language
3.	Descriptive Statistics Refresher
4.	Inferential Statistics Refresher
5.	Principal Component Analysis (PCA)
6.	Factor Analysis
7.	Cluster Analysis
8.	Multivariate Regression Analysis
9.	Content (text) Analysis
10.	Survival Analysis
11.	Network Analysis
12.	Time Series Analysis
13.	Machine Learning
14.	Conducting Empirical Research
15	Final exam

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