Faculty of Economics and Business Administration

COURSE UNIT (MODULE) DESCRIPTION

Course unit (module) title	Code
Computing and Data Analysis	Confirmed on May 15, 2024

Academic staff	Core academic unit(s)
Coordinator: Nora Marija Laurinaitytė **Other(s):**	Faculty of Economics and Business Administration

Study cycle	Type of the course unit
1st cycle (full-time studies)	Compulsory

Mode of delivery	Semester or period when it is delivered	Language of instruction
Face-to-face	Semester 4	English

Requisites	
Prerequisites: Statistical Theory (First year)	**Co-requisites (if relevant):**

Number of ECTS credits allocated	Student's workload (total)	Contact hours	Self-study hours
5	130	36	94

Purpose of the course unit		
The aim of the module – to develop undergraduate students' research skills in data handling, cleaning, analysis, visualisation and presentation by using statistical techniques and a number of computer software packages.		
Learning outcomes of the course unit (of the programme)	**Teaching and learning methods**	**Assessment methods**
Students: - will be able to use and undertake programming in the number of statistical software packages (R, MS Excel); (3.4)	Practicing to work with different data types and software packages both at university labs and at home.	Assignments for the lab sessions (4 assignments); Final group project and its presentation
- will undertake basic cleaning of micro, macro and financial datasets and preliminary data description of those datasets; (1.2; 3.4)	Lab sessions, home-works.	
- will undertake statistical analysis, hypothesis testing of datasets, visualisation of data, pattern recognition; (1.2; 4.2)	Theory lectures, examples, lab sessions, home-works.	
- will write reports of their data analysis, distilling key insights and conclusions and effectively present their results in a group setup. (4.1; 4.2)	Work in group and individually on real economic and financial data, preparation of reports, their presentations.	

Content	Contact hours							Self-study work: time and assignments	
	Lectures	Tutorials	Seminars	Workshops	Laboratory work	Internship	**Contact hours, total**	**Individual work**	**Tasks for individual work**
1. Introduction and overview to data analysis, its visualization, main tools and software packages (R, Python, MS Excel).	2	2					4	6	Reading lecture notes
2. Particularities of economic and financial data. Cross sections, time series, and panel data, high frequency and big data sets.	2	2			2		6	12	First introduction to different economic and financial data types and sets. Simple operations in the laboratory sessions. Assignment 1: Data downloading, reading, cleaning and preparing for analysis.
3. Exploratory data analysis (EDA) using R and MS Excel: Data summaries; visualisation (basic plots, scatter, bar, line, box, histograms and distributions). Script running, coding.	2	2			2		6	22	Assignment 2: Exploratory work with two different datasets, using both MS Excel and R. Prepare R script to visualise data.
4. Further data analysis: descriptive statistics, correlation, regression, classification, model selection. Script running, coding. Examples in R. Interpretation of results.	6	2			4		12	28	Assignment 3: use two datasets – one from economic growth literature (I Just Ran Two Million Regressions), another one from finance (VIX index). Produce codes and summary of both datasets. Assignment 4: Replication of the published paper that intensively uses data-analytic techniques.
5. Exporting results to the text processing software. Introduction to LaTeX, writing a report. Structuring and interpreting results.	2	2			4		8	26	Preparation of the final data-analytic report. It includes: importing data, cleaning of the dataset, exploratory analysis, descriptive analysis, production of codes as well as final report with economic interpretation of the data patterns.
Total:	**14**	**10**			**12**		**36**	**94**	

Assessment strategy	Weight, %	Deadline	Assessment criteria

Final (group) data-analytic project and its presentation	60	The exam session	Quality of data analysis, depth and width of statistical and computational tools that are used to conduct analysis, clarity of results, clarity and efficiency of the code, presentation quality.
Four assignments during the semester, each worth 10%	40	During the semester	Number of correct answers, creative solutions, meticulous and concise presentation of results

Author (-s)	**Publishing year**	**Title**	**Issue of a periodical or volume of a publication**	**Publishing house or web link**
Required reading				
Garrett and Grolemund and Hadley Wickham	2017	R for Data Science	1st Edition	O'Reilly Media
Christian Kleiber and Achim Zeileis	2008	*Applied Econometrics with R*	1st Edition	Springer-Verlag, New York
Roger D. Peng	2015	*R Programming for Data Sciences*		Learnpub.com