

Practical Data Analysis with R and Python II

SUBJECT DESCRIPTION

Subject Title	Code
Practical Data Analysis with R and Python II	

Lecturer (-s)	Division
Coordinating: Andrius Buteikis	Faculty of Mathematics and Informatics Institute of Applied Mathematics Department of Statistic Analysis

Study cycle	Subject type
First	Compulsory

Mode of delivery	Period	Study language
Auditorium	Fourth (Spring) semester	English

Subject objectives: the competences developed during the subject	
Preliminary requirements: Introductory Statistics, Practical Econometrics with R and Python I , Microeconomics	Parallel requirements (if any): Macroeconomics

Subject volume in credits	Total student workload	Contact hours	Self-study hours
5	135	64	71

Subject objectives: the competences developed during the subject		
Ability to work in a group and assume responsibility for the entrusted task. Ability to model various phenomena by mathematical and statistical means. Ability to use specialized statistical-econometric software.		
Learning outcomes from the subject	Study methods	Assessment methods
Upon successful completion of the subject studies, the student should have the following:		
Ability to classify time series (stationary sequences, sequences with trend, sequences with a unit root, multivariate models, etc.).	Problem-based teaching, case studies, discussion. Tasks in a computer lab/classroom.	Assessment of the adoption of statistical programs via midterms and final written examination.
Ability to classify the principles of specification and forecasting of a regression model with time series variables.		
Ability to use computer software.		

Topics	Contact hours					Self-study hours and tasks	
	Lectures	Consultations	Laboratory works	Seminars	Total contact work	Self-study	Tasks
1. Statistical data types and their models. Regression models, examples. R and Python programming languages.	2		2		4	8	[RLpa; ch. 0 & 1]
2. Stationary time series – white noise, stationary process, MA and AR processes and their forecasting, ARCH models.	4		6		10	6	[RLpa; ch. 2]
3. Time series with trend and seasonality components.	2		2		4	6	[RLpa; ch. 3]
4. Time series with unit root.	4		4		8	6	[RLpa; ch. 4]
5. Midterm I (computer class)			2		2	4	Preparation for the midterm.
6. Regressions with time lags	2		1		3	4	[RLpa; ch. 5]
7. Regressions with time series variables – stationary series and series with unit root, cointegrated variables, error correction model.	4		4		8	6	[RLpa; ch. 6]
8. Multivariate models – Granger causality, VAR and VECM models.	4		4		8	6	[RLpa; ch. 7]
9. Midterm II (computer class)			2		2	4	Preparation for the midterm.
10. Endogenous right-hand-side variables.	2		1		3	4	[RLpa; ch. 8]
11. Simultaneous equations	2		2		4	4	[RLpa; ch. 9]
12. Panel data models	2		2		4	5	[RLpa; ch. 10]
13. Final exam.	3	1			4	8	Preparation for the exam.
Total	31	1	32	0	64	71	

Grading strategy	Weight, %.	Date	Evaluation Criteria
<p>General assessment system: Depending on the level of students and the nuances of teaching and scheduling, assessment thresholds may change slightly, but generally at least 45 points is required to obtain a positive grade. (max. 100 pts.) and receive at least 5 pts. of the session exam (max. 40 pts.).</p> <p><u>Retention of examination.</u> Students who have received an unsatisfactory grade may take a written test of the entire course material during the retention period (assessed at 100 pts.). A minimum grade of 45 pts. is needed for passing.</p>			
Midterm I in computer classes	30	Week 7–8	One or two tasks from the lectured course material. The tasks are divided into 8 – 10 total parts. The tasks are worth a maximum of 30 points combined.

Midterm II in computer classes	30	Week 15-17	One or two tasks from the lectured course material. The tasks are divided into 8 – 10 total parts. The tasks are worth a maximum of 30 points combined.
Session examination	40	June	One or two tasks from the whole lectured course material. The tasks are divided into 10 – 12 total parts. The tasks are worth a maximum of 40 points combined.

Author	Date	Title	Periodical publication no. or volume of the publication	Publisher or web link
Required literature				
Buteikis A.	2019	Lecture notes and slides		http://web.vu.lt/mif/a.buteikis/category/practical-econometrics/practical-econometrics-ii-ii/
Lapinskas R.	2016	Practical Econometrics II: Time Series Analysis (Lecture Notes)		https://klevas.mif.vu.lt/~rlapinskas/Ekonometrija%20-%20Econometrics_R_gretl%20/Practical%20Econometrics%20with%20R%20and%20gretl.%20II/
Lapinskas R.	2016	Practical Econometrics II: Time Series Analysis (Computer Labs)		https://klevas.mif.vu.lt/~rlapinskas/Ekonometrija%20-%20Econometrics_R_gretl%20/Practical%20Econometrics%20with%20R%20and%20gretl.%20II/
Optional literature				
Diebold F.	2004	Elements of Forecasting, 3rd Ed.,		Thomson South-Western
Verbeek M.	2006	A Guide to Modern Econometrics, 3rd ed.		John Wiley & Sons