

Subject card

Subject name and code	Calculation Programming, PG_00156330						
Field of study	Informatics and Econometrics						
Date of commencement of studies	October 2024		Academic year of realisation of subject		2024/2025		
Education level	Master's studies		Subject group		Obligatory subject group in the field of study		
Mode of study	part-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish		
Semester of study	1		ECTS credits		3.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	Department of Statistics -> Faculty of Management -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		mgr Katarzyna Raca				
	Teachers		dr Tomasz Jurkiewicz				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	16.0	0.0	0.0	16
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan		Participation in consultation hours		Self-study	SUM
	Number of study hours	16		0.0		0.0	16
Subject objectives	Learning tools for programming statistical computations, acquiring the skills to independently program statistical computations in tensor programming languages.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[liEMU2_W04] The student has an in-depth knowledge of advanced mathematical, statistical, econometric and IT methods that enable the acquisition, processing and analysis of data reflecting the functioning and growth of the national economy and its components, as well as the phenomena and processes occurring in their environment.	The student knows the methods for creating computation algorithms, basic programming structures, and programming computations on tensors.	[SW1] oral statement/conversation/discussion [SW2] presentation/project/paper/report [SW5] implementation of a problem task
	[liEMU2_K01] The student understands the need for continuous completion and deepening of acquired knowledge. The student inspires and organizes others' learning processes.	The student recognizes the need to expand their knowledge of programming languages.	[SK1] oral statement/conversation/discussion [SK2] presentation/project/paper/report [SK8] observation of student's independent or team work
	[liEMU2_K02] The student can communicate freely with the public on specialised topics in the field of computer science and econometrics in and outside the workplace, communicate his knowledge and share his skills through various media. Culturally participates in discussions, is not afraid to ask questions and knows how to give constructive criticism.	The student is capable of analyzing processes and phenomena in an advanced manner, identifying causes, and predicting the effects of actions.	[SK1] oral statement/conversation/discussion [SK5] implementation of a problem task [SK8] observation of student's independent or team work
	[liEMU2_U07] The student is able to build advanced formal models of complex economic phenomena and processes, estimate them, carry out their verification and apply them to modeling, forecasting and optimization of resources of economic institutions of varying degrees of complexity, their structure and the course of processes in them.	The student is able to use tensor computation programming languages R and Python and independently prepare programs for statistical analyses.	[SU2] presentation/project/paper/report [SU5] implementation of a problem task [SU6] demonstration of practical skills [SU8] observation of student's independent or team work
	[liEMU2_K03] The student is able to communicate freely with the public inside and outside the workplace, transfer his knowledge and share his skills through various media.	The student is prepared to solve problems in teams.	[SK1] oral statement/conversation/discussion [SK2] presentation/project/paper/report [SK5] implementation of a problem task [SK6] demonstration of practical skills [SK8] observation of student's independent or team work
Subject contents	Programming languages for computation: R and Python - program description, usage, basic functions, and applications. Use of command window, history, editor, and workspace preview. Editing, running, and debugging programs. Syntax of the language. Basic data structures and operations on them. Algorithm development focused on matrix structures. Integration with other programs, importing and exporting data to and from text files and Excel. Using R and Python to create programs for computer simulations and statistical computational procedures.		
Prerequisites and co-requisites	Student should have: 1. Basic knowledge of descriptive statistics. 2. Basic knowledge of programming.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Python programming project	51.0%	50.0%
	R programming project	51.0%	50.0%
Recommended reading	Basic literature	Biecek P. (2011) Przewodnik po pakiecie R. Oficyna Wydawnicza GiS Biecek P. (2015) Pogromcy danych, http://www.biecek.pl/R/#Pogromcy Dawson M. (2005) Python Programming for the Absolute Beginner, Cengage Learning PTR McKinney W. (2022) Python for Data Analysis: Data Wrangling with Pandas, Numpy, and Jupyter, O'Reilly	
	Supplementary literature	Lutz M. (2010) Programming Python, O'Reilly Sweigart A. (2015) Automate the Boring Stuff with Python: Practical Programming for Total Beginners, No Starch Press Albon C. (2018) Machine Learning with Python Cookbook, O'Reilly	

	eResources addresses	Basic https://cran.r-project.org/other-docs.html - Manuals, tutorials provided by users of R https://cran.r-project.org/manuals.html - The R Manuals
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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