

Subject card

Subject name and code	Programming in Finance, PG_00177672						
Field of study	Finance and Accounting						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2026/2027		
Education level	Master's studies		Subject group		Obligatory subject group in the field of study Optional subject group Subject group related to scientific research in the field of study		
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	2		Language of instruction		Polish		
Semester of study	4		ECTS credits		5.0		
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						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	45.0	0.0	0.0	60
	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	60		4.0		61.0	125
Subject objectives	Learning about the possibilities of using Python programming in finance. Acquiring the skills to create automated formulas for calculations and visualizing financial data.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[FiRMU2_U04] From a finance and accounting perspective, students are able to select and effectively use, adapt, or develop new methods and tools from the fields of management, quality sciences, and economics. They can analyze and forecast economic processes as well as evaluate economic phenomena.	The student is able to select and apply appropriate analytical methods that enable forecasting and evaluation of economic phenomena, using the Python programming language.	[SU2] presentation/project/paper/report
	[FiRMU2_U12] The student can use technologies and IT systems (including advanced ones) to support their professional work in finance and accounting.	The student is able to use advanced methods for acquiring and analyzing financial data using the Python programming language.	[SU2] presentation/project/paper/report
	[FiRMU2_U02] The student is able to propose or design suitable solutions, including innovative ones, to complex problems in finance and accounting.	The student is able to create custom functions that facilitate solving problems in the area of finance and accounting, using the Python programming language.	[SU2] presentation/project/paper/report
	[FiRMU2_W05] The student possesses a comprehensive understanding of advanced and innovative methods, tools, and techniques for obtaining, utilizing, and analyzing data needed to assess the financial situation of various entities in management, quality sciences, economics, and finance.	The student is able to classify algorithms that enable solving selected problems in the field of finance. The student is able to list tools that allow for the acquisition of financial data.	[SW2] presentation/project/paper/report
	[FiRMU2_U03] Students can gather data from carefully chosen sources to verify its accuracy. They can then use and present both financial and non-financial information to analyze and evaluate economic processes and phenomena in management and quality sciences, as well as in economics and finance.	The student is able to create data visualizations and interpret the results of conducted analyses using the Python programming language.	[SU2] presentation/project/paper/report
Subject contents	Programming in Python: Integrated Development Environments (IDEs). Syntax and philosophy of the Python language. Object types, variables, and basic operations on them (including: lists and dictionaries). Built-in functions and comparison operators. Conditional statements and loops. Defining custom functions. Creating and managing data frames (pandas library). Operations on data vectors and matrices (NumPy library). Data preparation for analysis (pandas library). Introduction to data visualization packages (libraries: matplotlib, plotly, seaborn). Creating interactive dashboards (dash library). Web scraping and using APIs in Python (libraries: beautiful soup, pandas-datareader). Application of Python in Finance: Interactive charts for financial data. Automating the process of downloading financial data. Building custom functions for calculating financial ratios. Applying Monte Carlo simulations for financial instrument valuation. Applying statistical models to financial problems. Evaluating the quality of stock market valuations. Creating a tool for building a custom investment portfolio.		
Prerequisites and co-requisites	The student should have basic knowledge of finance, statistics and linear algebra.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Course project	51.0%	100.0%

Recommended reading	Basic literature	Michael Dawson, Python Programming for the Absolute Beginner, Third Edition, Cengage Learning Inc., 2010 Eric Matthes, Python Crash Course: A Hands-On, Project-Based Introduction to Programming, No Starch Press, 2019 Hilpisch Yves, Python for Finance: Analyze Big Financial Data, O'Reilly Media, 2015 Mark Lutz, Learning Python: Powerful Object-Oriented Programming, O'Reilly Media, 2013 Wes McKinney, Python for Data Analysis: Data Wrangling with Pandas, NumPy, and Jupyter (3rd Edition), O'Reilly Media, 2022 Eryk Lewinson, Python for Finance Cookbook: Over 80 powerful recipes for effective financial data analysis, wyd. Packt Publishing, 2022.
	Supplementary literature	Robert C. Martin, Clean Code: A Handbook of Agile Software Craftsmanship, Pearson, 2008. Stefan Jansen, Machine Learning for Algorithmic Trading. Predictive models to extract signals from market and alternative data for systematic trading strategies with Python, wyd. Packt Publishing, 2020. Foster Provost, Tom Fawcett, Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking, O'Reilly Media, 2013 Yves Hilpisch, Derivatives Analytics with Python: Data Analysis, Models, Simulation, Calibration and Hedging, wyd. Wiley, 2015.
	eResources addresses	
Example issues/ example questions/ tasks being completed		
Work placement	Not applicable	

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