

COURSE OF STUDY Statistics and methods for Economics and Finance
ACADEMIC YEAR 2024-2025
Statistical models for Finance

General information	
Year of the course	<i>First year</i>
Academic calendar	<i>Second semester</i>
Credits (CFU/ETCS):	6
SSD	<i>SECS-S/01</i>
Language	Italian
Mode of attendance	<i>Attendance at the course is strongly recommended</i>

Professor/ Lecturer	
Name and Surname	<i>Angela Maria D'Uggento</i>
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Department and address	<i>Economics and Finance</i>
Virtual room	
Office Hours (and modalities: e.g., by appointment, on line, etc.)	<i>Tuesday and Thursday, 9:00 am to 11:00 am. May change depending on class schedule and specific needs of professor or students.</i>

Organizzazione della didattica			
Ore			
Total	Lectures	Hands-on (laboratory, workshops, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
150	21	21	108
CFU/ETCS			
6	3	3	

Learning goals	To develop skills in the statistical analysis of financial return data using the statistical software R.
Course prerequisites	Preferably, the student should have acquired basic knowledge of statistical inference and probability.

Teaching strategies	<i>Lessons with PC exercises and slides. Seminars for in-depth analysis of specific topics using software.</i>
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Expected learning outcomes in terms of	
Knowledge and understanding	<i>At the end of the course, students will be able to recognize the different types of financial assets and calculate their returns; recognize and interpret the importance of the volatility of a financial asset as a measure of risk.</i>
Applying knowledge and understanding	<i>Students must learn to use the statistical analysis software R-Project to analyze data related to time series of financial asset returns and data available on financial portals on the Internet.</i>
Soft skills	<i>Students will be able to develop independent judgment and skills to produce a data analysis report. The use of scientific articles and of statistical software will support learning. Students must be able to identify the most appropriate methods for communicating the results of the analyzes performed.</i>
Syllabus	- Characteristics of financial data;

	<ul style="list-style-type: none"> - Introduction to the use of R software for analyzing financial data: Packages, graphical representation, creation of objects, functions and loops, data import; - The main statistical distributions for returns and their moments; - Volatility analysis: <ul style="list-style-type: none"> - Models for volatility o ARCH models: properties, advantages; - Model specification, examples and financial applications; - GARCH models: specification and estimation of models; - Other types of GARCH models: IGARCH, GARCH-M, exponential GARCH; - Symmetry and asymmetry, methods for testing asymmetric effects; - Notes on stochastic models for volatility; - Alternative approaches to volatility analysis (use of high-frequency data; opening and closing prices); - Applications of the volatility models discussed.
Texts and readings	R.S. Tsay (2013) An Introduction to Analysis of Financial Data with R, Wiley Ed. [Chapters I, 4 and 5].
Notes, additional materials	Materials provided in class or available at the instructor's direction or student request
Repository	

Assessment	
Assessment methods	Students will take an oral examination on the topics covered in the reference text or, alternatively, on the topics covered in a statistical analysis report (coursework) written by the student during the course with the support of the lecturer. In the latter case, both the report and the oral examination contribute equally to the final grade.
Assessment criteria	Knowledge and understanding of the topics covered and the ability to apply the knowledge to real data are assessed.
Final exam and grading criteria	The examination is passed with a grade of 18 or better. The grading scale varies between 18 for those who have acquired sufficient but general knowledge and 30 (possibly with distinction) for those who have acquired comprehensive knowledge and the ability to analyze and explore data in depth.