

Syllabus (a. y. 21-22)

372SM - DATA SCIENCE FOR INSURANCE

Part 1

SM35 - DATA SCIENCE AND SCIENTIFIC COMPUTING

Path: DATA SCIENCE FOR SOCIAL SCIENCES

TAF: D - A scelta dello studente

CFU: 6

Part 1: **24 h**

Lecturer

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[Link to UniTS web page](#) (office hours, CV)

Language	English
Summary	<p>The first module of the course will cover the following topics:</p> <ol style="list-style-type: none"> a. Financial risk and randomness: financial risk; risk factors and loss distributions; risk measures based on loss distributions; unconditional or conditional analysis. Time series of risk-factor changes and volatility estimation methods. b. Dependence and Copulas: basics of multivariate modelling; risk aggregation in quantitative risk management; correlation fallacies; copulas (definition and properties); some families of copulas; dependence measures; fitting copulas to data.
Textbooks and course material	<p>The slides used in the lectures will be uploaded on the Moodle page of the course. Two books that can be used to deepen the topics illustrated in the course are the following</p> <ul style="list-style-type: none"> • J. McNeil, R. Frey, and P. Embrechts, “Quantitative Risk Management: Concepts, Techniques and Tools” (2015), Revised Edition, Princeton Series in Finance

	<ul style="list-style-type: none">• D. Ruppert, D.S. Matteson, “Statistics and Data Analysis for Financial Engineering with R examples” (2015), 2nd edition, Springer [supplementary reading] <p>Additional material (scientific publications, exercises, R code) will be provided during the course.</p>
Objectives	<p>The course will provide the students with the knowledge and understanding of common risk measures and the main statistical tools to explore the features of loss data; students will learn simple concepts in the univariate setting, as well as more involved models to account for changing volatility and dependence modelling. By the end of the course, students will be able to</p> <ol style="list-style-type: none">i. Discuss main statistical issues in the financial and insurance context related to risk managementii. Exploit copula models for dependence modeling by using the R tools for statistical analysis and graphing. <p>Finally, students will develop critical thinking abilities to interpret, comment and compare the results from different analyses, and will be able to present</p>

	<p>their own work, by illustrating the methods they have adopted to analyze real data sets.</p>
Prerequisites	<p>The knowledge of the concepts of the STATISTICAL METHODS FOR DATA SCIENCE Course is strongly recommended.</p>
Didactic methods	<p>The course consists of frontal lectures and computer labs. Labs will focus on the use of the software R (students can bring their own laptop). Students will be encouraged to actively interact in the classroom, by asking questions and offering comments pertaining to the course. Moreover, quizzes will be scheduled throughout the course for self-evaluation.</p> <p>Lessons recordings will be available through the Course Team in the Teams Platform.</p>
Other Info	<p><i>Should it be necessary to make any changes to this syllabus in compliance with safety protocols related to the COVID19 emergency, an announcement will be posted on the webpage of the Department and Moodle page of the course.</i></p>
Final Evaluation	<p><i>To be determined.</i></p>