

Syllabus

Course description

Course title	Mathematics of Finance
Course code	27331
Scientific sector	STAT-04/A (ex-ehem SECS-S/06)
Degree	L-18 Bz
Semester and academic year	1; 2025/2026
Year	2025
Credits	6
Modular	No

Total lecturing hours	36
Total lab hours	
Total exercise hours	18
Attendance	Suggested, but not required
Prerequisites	No prerequisites, however it is advisable that the students have basic prior knowledge in statistics as well as in calculus and linear algebra
Course page	https://www.unibz.it/en/faculties/economics-management/bachelor-economics-management/course-offering/

Specific educational objectives	The course refers to the basic educational activities chosen by the student and belongs to the scientific area of Economics and Management. The course gives an introduction to fundamental concepts of finance and basic methods in financial mathematics. Students will learn how to transform a verbally exposed problem into a formula used in financial mathematics.
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Lecturer	Dr. Silvia Bressan, silvia.bressan@unibz.it
Scientific sector of the lecturer	SECS-S/06
Teaching language	English
Office hours	https://www.unibz.it/en/timetable/?department=26&degree=13009%2C13134
Lecturing assistant	Not foreseen
Teaching assistant	Not foreseen

List of topics covered	Mathematics of the time value of money and interest rates (simple interest, discount interest, compound interest). Annuities. Debt retirement methods. Mathematics of bond investments (yields, term structure of interest rates, bond duration and convexity, default risk). Mathematics of risk and return (arithmetic and logarithmic holding period return, expected return and standard deviation). Deviations from normality and tail risk (skewness, kurtosis, Value at Risk, expected shortfall).
Teaching format	Frontal lectures. Exercises will be solved using a standard calculator. Few examples will also be presented using Excel/R. Knowledge on the use of Excel/R is not a prerequisite and is not covered by the final assessment.

Learning outcomes	• <u>Knowledge and understanding:</u> Fundamental concepts of financial mathematics: Time value of money and interest rates; annuities; debt retirement methods; bond investments; risk and return. • <u>Applying knowledge and understanding:</u> Mathematical methods that apply the knowledge about the time value of money and interest rates, including applications to annuities and loan amortization schedules. Formulas for the assessment of bond investment performance. Understanding and assessment with mathematical tools of the financial risk-return trade-off. <u>Making judgments:</u> • Being able to choose appropriate quantitative methods and techniques that are applied in various real-life situations common to the financial industry. <u>Communication skills:</u> • Ability to explain the results obtained from the solution of exercises that require implementation of mathematical tools. • <u>Learning skills:</u> Being able to understand and find a solution for a particular financial problem of a particular investor/corporation using analytical reasoning and quantitative methods.
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Assessment	Written exam for attending and non-attending students with theoretical review questions and numerical exercises.
Assessment language	English

Required readings	Lecture slides and notes with exercises provided by the lecturer. Content is based on the following textbooks: - Jonathan Berk, and P. DeMarzo, "Corporate Finance", 4th edition, Pearson, 2017. ISBN: 9780134083278; - Zvi Bodie, Z., A. Kane, and A. Marcus, "Investments", 13th Edition, 2024. ISBN: 9781264412662; - Raymond Brooks, "Financial Management: Core Concepts", 4th Edition, Pearson, 2019. ISBN: 9780134730417; - Frank J. Fabozzi, "Capital Markets: Institutions, Instruments, and Risk Management", 5th Edition 2015, ISBN: 978-0-262-02948-3; - Gary C. Guthrie, and L. D. Lemon, "Mathematics of Interest Rates and Finance", New International Edition, Pearson, 2014. ISBN: 9780130461827.
Evaluation criteria and criteria for awarding marks	Final mark from exam assessment (100%) Relevant for exam assessment: Theoretical knowledge of the concepts covered in class and ability to solve financial problems.