unibz
Fakultät für Ingenieurwesen
Facoltà di Ingegneria
Faculty of Engineering

COURSE DESCRIPTION – ACADEMIC YEAR 2024/2025

Course title	**Introduction to Analysis and Optimization Techniques**
Course code	76436
Scientific sector	MAT/05
Degree	Bachelor in Informatics and Management of Digital Business (L-31)
Semester	2
Year	1
Credits	6
Modular	No

Total lecturing hours	40
Total lab hours	20
Attendance	Attendance is not compulsory, but highly encouraged. All the material used in the lectures and in the labs will be made available on the MS Teams of the course. However, students should note that an active engagement in understanding the theoretical notions and in finding solutions to the exercises is required to reach the learning outcomes of the course.
Prerequisites	--
Course page	https://ole.unibz.it/ and Teams

Specific educational objectives	The course belongs to the type "di base – formazione matematico-fisica". The course offers an introduction to the fundamental concepts and techniques of elementary calculus, mathematical analysis and optimization in connection to their use in business informatics and economics.

Lecturer	Andrea Mazzullo
Contact	Office B1.5.35, Faculty of Engineering, NOI Techpark, Via Bruno Buozzi 1, andrea.mazzullo@unibz.it, +39 0471 016030
Scientific sector of lecturer	INF/01
Teaching language	English
Office hours	By previous appointment
Lecturing Assistant (if any)	--
Contact LA	--
Office hours LA	--
List of topics	• Sequences and series • Univariate functions • Derivatives and differentials • Indefinite and Riemann integrals • Basic optimization techniques in one variable • Mathematical tools for decision making without and with uncertainty
Teaching format	• Frontal classroom lectures • Lab exercises

	In the lectures, concepts and techniques are introduced, both by presenting notions on the blackboard and by collectively discussing related exercises and examples. In the labs, students (either in small groups, or individually) develop possible approaches to address the exercises proposed by the lecturer and compare their solutions with the rest of the class.

Learning outcomes	Knowledge and understanding: • D1.1 - Possess basic knowledge of mathematical analysis, algebra, numerical calculation and optimisation methods which support computer science and advanced economics. Applying knowledge and understanding: • D2.1 - Ability to use mathematics and statistical data analysis tools to solve computational problems. Learning skills • D5.1 - Learning ability to undertake further studies with a high degree of autonomy.

Assessment	The assessment is based on a written final exam (100%). The written exam contains unseen questions about the material covered in the course. The aim of the written exam is to check to which degree students have mastered the following learning outcomes: 1) acquiring knowledge and understanding; 2) applying knowledge and understanding.
Assessment language	English
Assessment Typology	Monocratic
Evaluation criteria and criteria for awarding marks	Correctness and clarity of the answers.

Required readings	L. Peccati, S. Salsa, A. Squellati. Mathematics for Economics and Business. Bocconi University Press, 2017. Subject Librarian: David Gebhardi, David.Gebhardi@unibz.it
Supplementary readings	R.A. Adams, C. Essex. Calculus: A Complete Course. Pearson Education Canada, 2009 (7th ed.). M. Bramanti, C. Pagani, S. Salsa. Analisi Matematica 1. Zanichelli, 2008 (in Italian). E. Lanconelli. Lezioni di Analisi Matematica 1. Pitagora, 1994 (in Italian). W. Rudin. Principles of Mathematical Analysis. McGraw-Hill, 1976 (3rd ed.).
Software used	No software required.