COURSE DESCRIPTION – ACADEMIC YEAR 2022/2023

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 strongly recommended. The lectures consist of presentations on the black board, interspersed by small exercises, and discussions with the students. The goal of the course is to enable student to apply elementary calculus and analysis for mathematical problem solving, which is a skill that can only be acquired by training. All the material used in the lectures and labs as well as the assignments will be published on the OLE page of the course. Students should note that the slides and hand-written lectures notes are supporting material, but their study is not sufficient to reach the goal of the course. Experience tells that some students are able to acquire the intended skills without attending all the lectures or all labs, but attendance and success in studies are strongly correlated. Students who are unable to follow all lectures and labs are encouraged to attend at least some of them. They are also encouraged to work out all the exercises given during the lectures and the labs and to submit the coursework, for which they will receive feedback and marks.
Prerequisites	not required
Course page	https://ole.unibz.it/

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	Oswald Lanz
Contact	oswald.lanz@unibz.it
Scientific sector of lecturer	ING-INF/05
Teaching language	English
Office hours	Friday, 14:00-15:30, 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 lectures, • Lab groups supported by teaching assistants (TAs), • Coursework assignments that are corrected and commented. In the lectures, concepts and techniques are introduced, both by way of presentation on the blackboard and by small exercises. In the assignments, students refine these to apply them to selected problems. In the lab groups, students discuss possible approaches to the task of the exercises with the TAs and compare solutions. In addition, students also solve exercises that are independent of the assignments to deepen the understanding of the material presented in the lectures.

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: Applying knowledge and understanding: • coursework assignments (30%), • a written final exam (70%). To pass the course, the written exam must be passed. The assignments consist of exercises to apply knowledge acquired in the lectures. 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) Knowledge and understanding, 2) applying knowledge and understanding. Students who do not submit all assignments will be assessed on the written exam and the submitted parts of the coursework. For students who submit all assignments, the final mark will be a weighted average of the exam mark (70%) and the assignment mark (30%. If students do not submit all assignments, the percentage for the assignments

	will be lower. Also, assignments for which the mark is lower than the mark of the written exam will not be considered.
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	M. Bramanti, C. Pagani, S. Salsa. Analisi matematica 1. Zanichelli, 2008. (in italian)
Software used	No software required.