# COURSE DESCRIPTION – ACADEMIC YEAR 2020/2021

| | |
|---|---|
| **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 recommended.<br>Non-attending students have to contact the lecturer at the start of the course. |
| **Prerequisites** | |
| **Course page** | https://ole.unibz.it/ |

| | |
|---|---|
| **Specific educational objectives** | The course belongs to the type "di base – formazione matematico-fisica".<br>The aim of this course is to introduce students to the following topics: sequences and series, univariate functions, derivatives and differential calculus with some applications, basic optimization techniques (necessary and sufficient optimality conditions, a numerical method), discrete (financial) market models, and mathematical methods for decision making. |

| | |
|---|---|
| **Lecturer** | Andreas H Hamel and Nicola Gigante |
| **Contact** | Prof. Hamel:<br>Campus Bruneck- Brunico, 1st Floor, Room 1.11,<br>Andreas.Hamel@unibz.it, 0474 013651<br>Prof. Gigante:<br>Office 3.04, Faculty of Computer Science, Piazza Domenicani 3, BZ,<br>Nicola.Gigante@unibz.it |
| **Scientific sector of lecturer** | Prof. Hamel: SECS-S/06<br>Prof. Gigante: INF/01 |
| **Teaching language** | English |
| **Office hours** | During the teaching period - will be announced in class and on the course page. |
| **Lecturing Assistant (if any)** | Nicola Gigante |
| **Contact LA** | Office 3.04, Faculty of Computer Science, Piazza Domenicani 3, BZ,<br>Nicola.Gigante@unibz.it |
| **Office hours LA** | During the teaching period - will be announced in class and on the course page. |
| **List of topics** | • Sequences and series<br>• Univariate functions<br>• Derivatives and differentials<br>• Indefinite and Riemann integrals<br>• Basic optimization techniques in one variable |

| | |
|---|---|
| | • Mathematical tools for decision making without and with uncertainty |
| **Teaching format** | This course will be delivered through a combination of formal lectures and exercises. |

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

| | |
|---|---|
| **Assessment** | Written exam<br>The written exam consists of a set of verification questions, transfer of knowledge questions and exercises. The aim of the assessment is to check to which degree students have mastered the following learning outcomes: 1) knowledge and understanding, 2) applying knowledge and understanding. |
| **Assessment language** | English |
| **Assessment Typology** | Monocratic |
| **Evaluation criteria and criteria for awarding marks** | Final Written Exam, 100% covering the full program.<br>Written exam questions will be evaluated in terms of correctness, clarity, quality of argumentation and problem solving ability.<br>Evaluation criteria are the same for attending and non-attending students. |

| | |
|---|---|
| **Required readings** | Lecture Notes will be provided during the semester. Further required readings will be announced at the beginning of the course.<br>Subject Librarian: David Gebhardi, David.Gebhardi@unibz.it |
| **Supplementary readings** | Will be announced at the beginning of the course. |
| **Software used** | No software required. |