# COURSE DESCRIPTION – ACADEMIC YEAR 2020/2021

## Course Description

<table>
<thead>
<tr>
<th>Course title</th>
<th>Introduction to Analysis and Optimization Techniques</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course code</td>
<td>7643</td>
</tr>
<tr>
<td>Scientific sector</td>
<td>MAT/05</td>
</tr>
<tr>
<td>Degree</td>
<td>Bachelor in Informatics and Management of Digital Business (L-31)</td>
</tr>
<tr>
<td>Semester</td>
<td>2</td>
</tr>
<tr>
<td>Year</td>
<td>1</td>
</tr>
<tr>
<td>Credits</td>
<td>6</td>
</tr>
<tr>
<td>Modular</td>
<td>No</td>
</tr>
<tr>
<td>Total lecturing hours</td>
<td>40</td>
</tr>
<tr>
<td>Total lab hours</td>
<td>20</td>
</tr>
<tr>
<td>Attendance</td>
<td>Attendance is not compulsory, but recommended.</td>
</tr>
<tr>
<td></td>
<td>Non-attending students have to contact the lecturer at the start of the course.</td>
</tr>
<tr>
<td>Prerequisites</td>
<td></td>
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<tr>
<td>Course page</td>
<td><a href="https://ole.unibz.it/">https://ole.unibz.it/</a></td>
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</tbody>
</table>

## Specific educational objectives

The course belongs to the type "di base – formazione matematico-fisica".

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:**
- Campus Bruneck- Brunico, 1st Floor, Room 1.11,
- [Andreas.Hamel@unibz.it](mailto:Andreas.Hamel@unibz.it), 0474 013651

**Prof. Gigante:**
- Office 3.04, Faculty of Computer Science, Piazza Domenicani 3, BZ,
- [Nicola.Gigante@unibz.it](mailto:Nicola.Gigante@unibz.it)

## Scientific sector of lecturer

**Prof. Hamel:** SECS-S/06

**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,
- [Nicola.Gigante@unibz.it](mailto: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
- Univariate functions
- Derivatives and differentials
- Basic optimization techniques
- Discrete (financial) market models
### Teaching format
This course will be delivered through a combination of formal lectures and exercises.

### 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.
  - D2.1 - Ability to use mathematics and statistical data analysis tools to solve computational problems.

### Assessment
- **Written exam**
  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.
- Written exam questions will be evaluated in terms of correctness, clarity, quality of argumentation and problem solving ability.
- 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.

Subject Librarian: David Gebhardi, David.Gebhardi@unibz.it

### Supplementary readings
Will be announced at the beginning of the course.

### Software used
No software required.