

## COURSE DESCRIPTION – ACADEMIC YEAR 2018/2019

<b>Course title</b>	<b>Programming for Data Analytics</b>
<b>Course code</b>	73003
<b>Scientific sector</b>	INF/01
<b>Degree</b>	Master in Computational Data Science (LM-18)
<b>Semester</b>	1
<b>Year</b>	1
<b>Credits</b>	6
<b>Modular</b>	No
<b>Total lecturing hours</b>	40
<b>Total lab hours</b>	20
<b>Attendance</b>	Attendance is not compulsory, but non-attending students have to contact the lecturer and the lecturing assistant, at the start of the course, and inform them about it. Both non-attending and attending students have to pass 50% of the lab assessment to be admitted to the written exam. The lab assessment consists of assignments and a project work.
<b>Prerequisites</b>	The students should be familiar with: <ul style="list-style-type: none"> <li>• computer programming</li> <li>• linear algebra</li> <li>• statistics</li> </ul>
<b>Course page</b>	<a href="https://ole.unibz.it/">https://ole.unibz.it/</a>
<b>Specific educational objectives</b>	<p>The course belongs to the type "caratterizzanti – discipline informatiche" in the curriculum "Data Analytics".</p> <p>The course is designed to provide specific professional skills. The students will learn how to organize and analyze data by writing programs. More specifically, the students will practically learn to import, manipulate, analyze, visualize, and model a dataset. The students will also get familiar with libraries that can be effectively used for data analytics.</p>
<b>Lecturer</b>	<a href="#">Mehdi Elahi</a>
<b>Contact</b>	<a href="mailto:meelahi@unibz.it">meelahi@unibz.it</a> , Office POS 1.13 <a href="https://linkedin.com/in/mehdielahi">https://linkedin.com/in/mehdielahi</a>
<b>Scientific sector of lecturer</b>	INF/01
<b>Teaching language</b>	English
<b>Office hours</b>	Office ours are available by appointment.
<b>Lecturing Assistant (if any)</b>	<a href="#">Marko Tkalcic</a>
<b>Contact LA</b>	<a href="mailto:marko.tkalcic@unibz.it">marko.tkalcic@unibz.it</a> , Office POS 1.13 <a href="http://www.inf.unibz.it/~tkalcic/">http://www.inf.unibz.it/~tkalcic/</a>
<b>Office hours LA</b>	To be defined by appointment.
<b>List of topics</b>	<ul style="list-style-type: none"> <li>• Introduction to programming languages for Data Analytics (Python, R)</li> <li>• Data pre-processing (parsing, normalization)</li> <li>• Exploratory data analysis (clustering, visualization)</li> <li>• Building and evaluating predictive models (regression, classification)</li> </ul>

	<ul style="list-style-type: none"> <li>• Designing the data pipeline</li> </ul>
<b>Teaching format</b>	<ul style="list-style-type: none"> <li>• Frontal Lectures</li> <li>• Lab exercises</li> <li>• Project Work</li> </ul>

<b>Learning outcomes</b>	<p>Knowledge and understanding:</p> <ul style="list-style-type: none"> <li>• D1.2 - Understanding of the skills, tools and techniques required for an effective use of data science</li> <li>• D1.3 - Knowledge of principles, methods and techniques for processing data in order to make them usable for practical purposes, and understanding of the challenges in this field</li> </ul> <p>Applying knowledge and understanding:</p> <ul style="list-style-type: none"> <li>• D2.1 - Practical application and evaluation of tools and techniques in the field of data science</li> <li>• D2.4 - Ability to develop programmes and use tools for the analysis and management of data and related infrastructures</li> <li>• D2.8 - Practical application and evaluation of tools and techniques for data analysis</li> </ul> <p>Making judgments</p> <ul style="list-style-type: none"> <li>• D3.2 - Ability to autonomously select the documentation (in the form of books, web, magazines, etc.) needed to keep up to date in a given sector</li> </ul> <p>Communication skills</p> <ul style="list-style-type: none"> <li>• D4.1 - Ability to use English at an advanced level with particular reference to disciplinary terminology</li> <li>• D4.3 - Ability to structure and draft scientific and technical documentation</li> </ul> <p>Learning skills</p> <ul style="list-style-type: none"> <li>• D5.3 – Ability to deal with problems in a systematic and creative way and to appropriate problem solving techniques.</li> </ul>
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<b>Assessment</b>	<p>The final mark will be awarded based on:</p> <ul style="list-style-type: none"> <li>• 50% lab assessment (lab assignments and a project work)</li> <li>• 50% written exam assessment</li> </ul> <p>The lab assessment evaluates the capability of the students in applying the data analytics techniques in practical settings. The written exam assessment evaluates the ability of students to understand, recall, and use these techniques, reviewed in the course.</p> <p>In order to be admitted to the written exam, the students have to pass 50% of the lab assessment (i.e., lab assignments and a project work). In case the lab assessment is positive but the final written exam is not positive, the lab grade is valid for three regular exam sessions.</p> <p>The project work is mainly for evaluating the programming skills of the students and it would be the participation in a competition. The students are given a data analytics task, and each of them has to individually develop a program for computing the solution. The students who submit a solution receive the mark for the project work, according to their positions in a leaderboard. For every regular exam session, the complete description of the competition, the rules,</p>
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	and the timeline will be provided in the course page. At the end of the competition, the source code and a 1-2 page(s) final report should be delivered by each of the students.
<b>Assessment language</b>	English
<b>Assessment Typology</b>	Monocratic
<b>Evaluation criteria and criteria for awarding marks</b>	<p>The final mark is composed of:</p> <ul style="list-style-type: none"> <li>• 50% lab assessment (lab assignments and a project work)</li> <li>• 50% written exam assessment</li> </ul> <p>In order to be admitted to the written exam, the students have to obtain 50% of the lab assessment. The lab assessment evaluates the ability of students to apply their data analytics knowledge in practical settings.</p> <p>The written assessment evaluates the ability of students to understand, recall, and use their knowledge (principles and methods) of data analytics.</p>
<b>Required readings</b>	<p>Sebastian Raschka, Python Machine Learning: Unlock Deeper Insights into Machine Learning With This Vital Guide to Cutting-edge Predictive Analytics, Packt Publishing Ltd, 2015 (Permanent link at library access to Safari Books: <a href="#">Link</a>)</p> <p>Subject Librarian: David Gebhardi, <a href="mailto:David.Gebhardi@unibz.it">David.Gebhardi@unibz.it</a></p>
<b>Supplementary readings</b>	<p>Brett Lantz, <b>Machine learning with R</b>. Packt Publishing Ltd, 2015. (Permanent link at library access to Safari Books: <a href="#">Link</a>)</p>
<b>Software used</b>	<ul style="list-style-type: none"> <li>• Jupyter Notebook (for Python programming)</li> <li>• RStudio (for R programming)</li> </ul>