Syllabus
Course description

Course title	Advanced Data Analysis
Course code	27084
Scientific sector	ING-INF/05
Degree	Master in Entrepreneurship and Innovation
Semester and academic year	1st semester 2019-2020
Year	2
Credits	6
Modular	No

Total lecturing hours	36
Total lab hours	0
Total exercise hours	0
Attendance	strongly suggested, but not required; for non-attending students additional study material which covers the entire course is available
Prerequisites	English understanding and reading at level B2. A basic course in computer science covering basic Microsoft Windows, file handling, basic Internet usage, Excel or a similar data organization program at good level.
Course page	www.paolocoletti.it/advanceddataanalysis

Specific educational objectives	The course is designed to acquire further computer skills, providing knowledge and experience with automatic tools and techniques to organize and analyse data.

Lecturer	Paolo Coletti Office E 203 Paolo.Coletti@unibz.it tel. 0471 013497 www.paolocoletti.it
Scientific sector of the lecturer	ING-INF/05
Teaching language	English
Office hours	please refer to the lecturer's timetable
Lecturing assistant	none
Teaching assistant	none
Office hours	18
List of topics covered	Relational databases. Microsoft Access: relations, queries, summary queries, modification queries, left and right joins. Cryptocurrencies and blockchain technology. R statistical package basic data organization, descriptive statistics, data analysis with R, graphs.
Teaching format	Frontal lectures in standard classroom with examples and exercises. Students use their own notebook and/or repeat

	the lesson at home through provided videos. Optional home exercises, to be repeated in class in front of the colleagues. Optional group homework.

Learning outcomes	**Entrepreneurship**: Knowledge and understanding • knowledge of automatic tools to collect, organise and analyse quantitative data • relational database structures • a database management system • data organization • statistical data analysis Applying knowledge and understanding • experience with tools and techniques to collect, organise and analyse quantitative data in different formats • queries and modification to data in a database • efficient interaction with databases • efficient and clean graphical representation of data • modifying data through a statistical program • representing and summarizing data through a statistical program • potential benefits and threats of cryptocurrencies and blockchain technology for a firm Making judgments • deciding which tool or technique to choose when dealing with a data organization problem • observing and evaluating graphical and statistical representation without being misled Communication skills • building efficient and straightforward graphical representations • building statistics to support communications with objective data Learning skills • using online help system to further expand programs usage **Innovation**: Knowledge and understanding • knowledge of tools to collect and organize new data • structure of relational databases • most common errors and omissions in advanced graphical representations • import and handling of data in a statistical package • basic knowledge of blockchain emerging technology

	Applying knowledge and understanding • experience with automatic tools and techniques to extract data from sources • summary queries to an online database with the creation of virtual fields • organising data in a relational database • representing data using advanced online graphical tools • handle and modify quantitative data • finding statistical relations in data Making judgments • deciding the difficulty level in retrieving data for analysis Learning skills • finding suitable statistical tests to analyse data.

Assessment	1. Written assessment to test abilities to understand a data organizational problem and build and describe an appropriate relational database. 2. Practical assessment to test data extraction and handling ability on a Access database. As alternative to points 1 and 2, group homework to test database design and data extraction capabilities using either Access or MySQL. 3. Practical assessment to test knowledge of R and statistical tools. As alternative, if the number of students allows it, regular attendance, homework and class presentations. 4. Written test on blockchain technology.
Assessment language	English
Evaluation criteria and criteria for awarding marks	Grade is the weighted average of assessment 1 (23%), assessment 2 (23%), assessment 3 (48%) and assessment 4 (6%). File handling and severe basic computer errors count negatively on the final grade. Particular emphasis is given to solutions which are optimal, efficient and extensible. Active participation in class counts positively towards the final grade.

Required readings	• Databases course book, book available on www.paolocoletti.it/advanceddataanalysis • Videos on databases available on www.paolocoletti.it/advanceddataanalysis • Videos on Access available on www.paolocoletti.it/advanceddataanalysis • Videos on cryptocurrencies and technology blockchain available on www.paolocoletti.it/advanceddataanalysis • Videos on statistics with R available on www.paolocoletti.it/advanceddataanalysis
Supplementary readings	• Data analysis course book, book available on

	www.paolocoletti.it/advanceddataanalysis
	• Natasha A. Karp, R commander an Introduction, 2010, available on http://cran.r-project.org/doc/contrib/Karp-Rcommander-intro.pdf
	• Infographics course book, book available on www.paolocoletti.it/advanceddataanalysis
	• Nicole M. Radziwill, Statistics (The Easier Way) with R: an informal text on applied statistics, 2015, ISBN 978-0692339428