

Syllabus

Course description

Course title	Statistical Methods for Business Analysis
Course code	25559 (27174 for students enrolled before 2022)
Scientific sector	SECS-S/01
Degree	Master in Entrepreneurship and Innovation
Semester and academic year	2nd semester, ay 2024-25
Year	1st study year
Credits	6
Modular	No

Total lecturing hours	36
Total lab/exercise hours	18
Attendance	Suggested, but not required
Prerequisites	No formal prerequisite is set; nevertheless, the frequency of a pre-course in Mathematics is suggested in order to properly follow the lectures.
Course page	https://www.unibz.it/en/faculties/economics-management/master-entrepreneurship-innovation/course-offering-from-2021/

Specific educational objectives	<p>The course refers to the typical educational activities and belongs to the scientific area of Statistic-Mathematic.</p> <p>This course introduces a wide range of statistical tools for making inferences and predictions from data, including regression, classification, supervised methods and unsupervised methods. All the methods covered in class are illustrated using real datasets, commonly found in business and management. Analyses will be performed within the R statistical computing environment.</p> <p>At the end of the course, the students will be able to select and use properly a wide range of statistical learning and forecasting tools. They will be also able to draw conclusions from their analyses in the context of real data.</p>
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Lecturer	Alessandro CASA UNIBZ Office E523 Brunico-Bruneck NOI Techpark Office 3.11 e-mail: alessandro.casa@unibz.it
Scientific sector of the lecturer	SECS-S/01
Teaching language	English
Office hours	See time table
Lecturing assistant	Dott.ssa Giulia Bertagnolli

Teaching assistant	Not foreseen
Office hours	18
List of topics covered	<ul style="list-style-type: none"> • Principles of statistical inference: confidence intervals and hypothesis tests • Introduction to statistical learning: basic notions and concepts • Linear regression and its extensions • Other regression methods (trees, splines, additive models) • Logistic regression and other classification tools • Model selection, model assessment and evaluation of model complexity • Unsupervised learning: principal components and clustering techniques • Application with the software R
Teaching format	Frontal lectures and computer labs.
Learning outcomes	<p>Knowledge and understanding:</p> <ul style="list-style-type: none"> - basic notions and concepts on statistical inference and hypothesis testing - statistical models, theory and tools for business analysis: model selection and forecasting - quantitative models for regression, classification and market segmentation <p>Applying knowledge and understanding:</p> <ul style="list-style-type: none"> - ability to find and select relevant data for management and business innovation - ability to identify the statistical models that are suitable to analyze correctly a specific socio-economic and industrial framework - ability to provide forecasts in different application scenarios - ability to classify and analyze specific innovations and their potential development <p>Making Judgements:</p> <ul style="list-style-type: none"> - ability to select and apply appropriate models and tools of statistical analysis <p>Communication skills:</p> <ul style="list-style-type: none"> - ability to communicate precisely the results of statistical analyses to a general audience <p>Learning skills:</p> <ul style="list-style-type: none"> - ability to establish links among different statistical models

Assessment	<p>Attendings Students: Written exam and project assignment:</p> <ul style="list-style-type: none"> - written exam with exercises and review questions for both attending and non-attending students (60% of the final grade, if the projects have been done); - projects done during the semester, for attending students (40% of the final grade) <p>Non-attending Students: written exam (100%)</p> <p><i>Note: project assignment is valid for 1 academic year and cannot be carried over beyond that time-frame</i></p>
Assessment language	English
Evaluation criteria and criteria for awarding marks	<p>The written exam consists of exercises and review questions. The project assignment involves statistical analyses on real data related to the contents of the course, using the statistical software R.</p> <p>To pass the exam, students must obtain a positive evaluation in both written exam and project assignment.</p>
Required readings	<p>James, G., Witten, D., Hastie, T., Tibshirani, R. <i>An Introduction to Statistical Learning with Applications in R</i>. Springer, 2013. Freely available at http://www-bcf.usc.edu/~gareth/ISL/</p> <p>Additional lecture notes will be provided</p>
Supplementary readings	<p>Agresti, A., Finlay, B. <i>Statistica per le scienze sociali</i>, Pearson, 2009.</p> <p>Hyndman, R.J. and Athanasopoulos, G. <i>Forecasting: principles and practice</i>, 2nd edition, OTexts: Melbourne, 2018.</p> <p>Cicchitelli, Giuseppe. <i>Statistica. Principi e metodi</i>. Pearson, 2008.</p> <p>Azzalini, Adelchi, and Bruno Scarpa. <i>Data analysis and data mining: An introduction</i>. OUP USA, 2012.</p> <p>Grigoletto, Matteo, Laura Ventura, and Francesco Pauli. <i>Modello lineare: teoria e applicazioni con R</i>. G Giappichelli Editore, 2017.</p> <p>Johnson, Richard A., and Dean W. Wichern. "Applied multivariate statistical analysis." <i>New Jersey</i> 405 (1992).</p>