



# UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze Economiche, Aziendali e Statistiche		
ACADEMIC YEAR	2020/2021		
MASTER'S DEGREE (MSC)	BUSINESS ECONOMIC SCIENCES		
SUBJECT	STATISTICAL METHOD FOR BUSINESS DECISIONS		
TYPE OF EDUCATIONAL ACTIVITY	B		
AMBIT	50585-Statistico-matematico		
CODE	15947		
SCIENTIFIC SECTOR(S)	SECS-S/01		
HEAD PROFESSOR(S)	AGRO' GIANNA	Professore Associato	Univ. di PALERMO
OTHER PROFESSOR(S)			
CREDITS	6		
INDIVIDUAL STUDY (Hrs)	114		
COURSE ACTIVITY (Hrs)	36		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	1		
TERM (SEMESTER)	2° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	<b>AGRO' GIANNA</b> Monday 11:00 12:00 solo per AGRIGENTO sala dei professori piano terra villa Genuardi Tuesday 12:00 13:30 stanza 107. 1°piano edificio 13 Wednesday 12:00 13:30 stanza 107. 1°piano edificio 13 Friday 17:00 18:00 solo per AGRIGENTO sala dei professori piano terra villa Genuardi		

DOCENTE: Prof.ssa GIANNA AGRO'

<b>PREREQUISITES</b>	Definition of matrix and determinant of a matrix . Double random variables : probability distribution , center of gravity, the variance and covariance matrix. Linear combination of random variables . Elements of mathematical analysis in multidimensional spaces. Elements of statistical inference and hypothesis testing.
<b>LEARNING OUTCOMES</b>	<p>Knowledge and ability to understand</p> <p>The knowledge necessary to deal with a problem of economic nature, which involves the study of several quantitative variables, by means of multidimensional statistical analysis methods. In particular: to understand the aim of investigation, identifying the necessary variables, the units statistics for the detection and the data processing methods.</p> <p>Capacity to apply knowledge and understanding. Being able to properly use the methods learned on the basis of the available data and keeping in mind the objective of the research and know summed up in an elaborate your findings.</p> <p>Making judgments Develop capacity 'judgment about the limits and the potential' of the typical multivariate analysis methods applied to business problems, recognizing when these help to expand knowledge.</p> <p>Enable 'communicative. Be able to present a report on the study multidimensional data that is clear since 'targeted to technical knowledge of the recipient and exhaustive for what' regarding the result.</p> <p>Capacity 'learning. Starting from the methods studied during the course, be able to learn other methods independently because 'you have learned the methodological foundations multidimensional statistical analysis, but also ability' to critically read the works related to studies in the corporate sector involving statistical methods.</p>
<b>ASSESSMENT METHODS</b>	<p>Written test: presentation of a report concerning the analysis of economic and business data by means of the language R.</p> <p>Oral test: at least two questions are asked and the answer is evaluated on the basis of 1) the understanding of the application 2) the ability to express a punctual response, 3) the mathematical-statistical language used.</p> <p>The assessment is carried out of thirty.</p> <p>Rejected: Not sufficient 18: Just sufficient 19-21: Fully sufficient / More than sufficient 22-24: Fairly good 25-27: Good 28-29: Very good 30: Excellent 30 e lode: Excellent cum laude</p>
<b>EDUCATIONAL OBJECTIVES</b>	<p>Knowledge of the main multivariate statistical methods for exploratory analysis of multidimensional data .</p> <p>Ability to obtain useful knowledge from large set of data, available to the computerized treatment.</p>
<b>TEACHING METHODS</b>	Lectures and computer lab
<b>SUGGESTED BIBLIOGRAPHY</b>	<p>Zani S. Cerioli A. "Analisi dei dati e data mining per le decisioni aziendali" Giuffrè (2007).</p> <p>Fabbris L. " Statistica multivariata" McGraw-Hill (1997)</p> <p>Biggeri L. et al. "Statistica per le decisioni aziendali" Pearson (2012)</p> <p>Rizzi A. "Il linguaggio delle matrici" NIS (1990)</p>

## SYLLABUS

Hrs	Frontal teaching
4	Some algebra of matrices. Arrays of data and multi-dimensional analysis.
7	The Principal Component Analysis ( ACP ) : size of the variable space and its reduction of dimension. Definition of the main components; analytical determination of the CP for a two variables problem. The main criteria for the choice of number of components .The scores. Singular values decomposition of a matrix . Construction and meaning of a Biplot .
7	Some measures of distance between points and similarity indices. Assessing a cluster analysis problem. Main features and properties of the hierarchical methods: cluster algorithms; the dendrogram. Main features and properties of the non-hierarchical methods; K-averages method ; method of dynamic aggregation; structure of iterative algorithms and stopping criteria. Goodness of a partition .
6	The least squares method for the calculation of the multiple linear regression model coefficients . The system of linear equations and the matrix solution . Goodness of fit and coefficient $R^2$ . The residual analysis . Methods for objective selection of variables .
4	Correspondence analysis : basic principles , distance between profiles and metric chi-square . Inertia and singular value decomposition . Judgment on the goodness of the analysis and scores.
8	Introduction to the statistical software R. Presentation of the main algorithms for the solution of multivariate analysis problems. Introduction to the SAS if available in the computer room.