



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze Economiche, Aziendali e Statistiche		
ACADEMIC YEAR	2017/2018		
MASTER'S DEGREE (MSC)	STATISTICAL SCIENCE		
SUBJECT	CATEGORICAL DATA ANALYSIS		
TYPE OF EDUCATIONAL ACTIVITY	C		
AMBIT	21031-Attività formative affini o integrative		
CODE	16442		
SCIENTIFIC SECTOR(S)	SECS-S/01		
HEAD PROFESSOR(S)	SCIANDRA MARIANGELA	Professore Associato	Univ. di PALERMO
OTHER PROFESSOR(S)			
CREDITS	6		
INDIVIDUAL STUDY (Hrs)	108		
COURSE ACTIVITY (Hrs)	42		
PROPAEDEUTICAL SUBJECTS			
MUTUALIZATION			
YEAR	2		
TERM (SEMESTER)	1° semester		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	SCIANDRA MARIANGELA Wednesday 12:00 14:00 DSEAS 2 piano		

PREREQUISITES	The course requires a deep knowledge of inferential statistics and probability.
LEARNING OUTCOMES	<p>KNOWLEDGE AND CAPACITY OF UNDERSTANDING</p> <ol style="list-style-type: none">1. Knowledge of methods and models for the analysis of categorical data;2. Understanding of the questions which can be answered by means of such methods and models; <p>CAPACITY TO APPLY KNOWLEDGE AND UNDERSTANDING</p> <ol style="list-style-type: none">1. Ability to properly select methods and models for dealing with specific problems.2. Ability to use critically the computational tools available in the R environment.3. Ability to interpret the results obtained with the chosen methods and models. <p>JUDGEMENT</p> <p>Being able to provide a critical reading of the key results obtained in relation to the phenomenon studied and the methodologies used.</p> <p>ENABLE COMMUNICATION</p> <ol style="list-style-type: none">1. Ability to discuss the characteristics of a practical problem and comment the obtained results, both with other statisticians and with non statisticians.2. Ability to write a scientific-technical report, focussed on the subject-matter problem tackled, illustrating the chosen method and the results obtained. <p>LEARNING ABILITY</p> <ol style="list-style-type: none">1. Ability to use, in an integrated way, the notions acquired in previous Statistics and Applied Statistics courses.2. Ability to consult and understand the international statistical literature on categorical data analysis, in order to update knowledge and technical skills.
ASSESSMENT METHODS	<p>The exam consists of an oral interview, only for students passing the written test. The Committee will be constituted by the lecturer teaching and at least another professor or researcher of the same or similar subject area, or an expert on the subject. Since the course is held in English both tests (written and oral) will be held in English.</p> <p>WRITTEN TEST</p> <p>The written test is designed to detect the knowledge and skills owned by the student and his ability to summarize it into a report. The test will take at maximum three hours and includes 2 questions (articulated in 3 sub-points each) of practical and theoretical nature.</p> <p>ORAL EXAM</p> <p>The oral exam is intended to deeply evaluate the student competences. It will consist in two questions aimed at graduate better the assessment of knowledge, skills and abilities on the topics discussed during the course. The threshold for a sufficient evaluation of the oral test will be reached when the student has demonstrated knowledge and understanding of the topics.</p> <p>METHOD FOR FINAL EVALUATION</p> <p>The final evaluation will take into account three aspects : i) the student level of knowledge of the topics; ii) the ability to apply his/her knowledge and iii) the property of language.</p> <p>FINAL EVALUATION OF TEACHING</p> <p>The final score will be out of thirty . The range of the vote will allow teacher to take account of several aspects (such as active participation to the classes and exercises , or the presence of some disabilities) .</p> <p>During the written exam will not be allowed to use mobile phones , smartphones and personal notebook / tablet. At any time during the written test, the student can decide to stop the examination . If the student does not pass the exam he/her can participate to the next one .</p>
EDUCATIONAL OBJECTIVES	This course aims to provide students with a statistical background and practical skills to apply more advanced modelling techniques specific for categorical data problems. Students must be able to identify the best statistical tool to investigate a problem related to categorical data (binary, ordered). In presence of a multiway categorical problem, students must be able to understand if the problem asks for an associative or dependence structure and also to identify the

	most parsimonious way to describe the data generating process. In the end, students must be able to represent categorical data problems and results using specific graphical tools Ability to discuss the characteristics of a practical problem and comment the obtained results and interpret results to non statisticians.
TEACHING METHODS	The course will take place entirely in english with lectures and laboratories with software supports; students will be ask to partecipate actively to the class resolution of the questions.
SUGGESTED BIBLIOGRAPHY	<p>Agresti A. (2002) The analysis of categorical data (2nd ed.), Academic Press, London. (Chs. 1 to 9) Disponibile presso la biblioteca del DSEAS</p> <p>Johnson, Valen E., Albert, James H. (1999), Ordinal Data Modeling, Springer-Verlag New York (Chs. 3 and 4) Acquistabile online o presso la libreria universitaria.</p>

SYLLABUS

Hrs	Frontal teaching
6	1. Introduction 1.1 Basic concepts and definitions: categorical variables, categorical data matrices, analysis of directed and undirected relationships, approaches with and without probabilistic formalisation 1.2 Recall of discrete multivariate distributions
14	2. Two-way contingency tables 2.1 The 2x2 contingency table , Measures of association and dependence • Logit-linear and log-linear models 2.2 Extensions to the IxJ contingency table 2.3 Polytomous response models 2.4 Ordinal categorical variables models
10	3. Multiway contingency tables 3.1 Measures and models of association and dependence 3.2 Model selection procedures 3.3 Graphical models (a short overview)
Hrs	Practice
2	Introduction: laboratory tutorials in R
8	Two-way contingency tables: laboratory tutorials in R
2	Multiway contingency tables: laboratory tutorials in R