UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Statistical Models for Cognitive Neuroscience

2324-1-F5108P006

Learning area

Methods, techniques and instruments for psychology
Statistics and quantitative methods

Learning objectives

Knowledge and understanding

Statistics for correlation data
Statistics for experimental data
Simple and complex relationships among different types of variables
Advanced concepts of measurement in neurosciences

Applying knowledge and understanding

Ability to analyze data collected in different research designs
Understanding and evaluating third-party statistics and their quality
Estimating and understanding simple and relationships among variables.
Employing and evaluating different types of neurophisialogical measures
Use of statistical software

Contents

An overview of several statistical techniques and methodological concepts is provided, giving the student the ability to collect and analyze data in a wide range of research situations. Advanced statistical techniques are presented, with emphasis on the interpretation of results. Fundamental concepts related with measurement in psychology are also discussed.

Detailed program

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Statistical models and inferential statistics
The general linear model
Linear, non-linear and interactions effects
Statistics for repeated-measures designs
Generalized linear model
Factor analysis
 Power Analysis
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Practice Labs
Practice with jamovi statistical software and hands-on exercises with real data.

Prerequisites

Descriptives statistics (measures of central tendency and dispersion); Basics of inferential statistics; regression and correlation; t-test

Teaching methods

Theoretical and practical classes. In the theoretical lessons the foundations of the statistical techniques are presented and discussed, their applicability, with special focus on the interpretation of the results. Using several examples found in the neuroscientific literature, students with different mathematical backgrounds should be able to understand what is needed to carry out and interpreting the statistical analyses discussed in the course.
Practice sections in the computer labs with analyses of real data and discussion.

Assessment methods

Written final test with multiple-choice questions and open-end questions based on data analyses. Optional oral exam.

Multiple-choice questions (20) will assess particularly the understanding of the theoretical models underlying psychometric measurement and data analysis techniques. They weight for 1/3 of the final grade.

Open-ended questions (3 to 5) will assess the ability to apply this knowledge for developing research projects and for analyzing data. The student will be assessed on their ability to understand a research design, select the statistical techniques useful to answer the researcher questions, execute them with the statistical software, interpret and report the results following international standard (APA)

The possibility of an oral exam is offered to students who consider that the result of the exam does not reflect their real competence and it will assess both theoretical knowledge and practical abilities. The oral exam mark will be averaged with the written exam mark to compose the final grade.

Students will also have the possibility to take simulation test, equivalent to the final test. The aim of the simulation is to acquaint students to the test environment and to give them feedback before the take the exam.

Although this course is held in Italian, for Erasmus students, the course material is available also in English, and students can take the exam in English if they wish to do so.

Textbooks and Reading Materials

Slides and additional material offered via elearning page.

Book: Gallucci M., Leone L., Berlingeri, E. (2017). Modelli statistici per le scienze sociali, seconda edizione. Milano: Pearson Educational.

Sustainable Development Goals

QUALITY EDUCATION