UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Statistics for The Social Sciences (blended)

2324-1-E2004P006

Learning area

3: Study of socio-economical and cultural aspects related to communication processes.

Learning objectives

Knowledge and understanding

- Real-world investigation. Measurement Scales. From concepts to variables: operationalization of concepts into statistical measures.
- Data production methodology in official statistics, with special regard to the National Institute of Statistics - Istat.
- Istat in the supranational network of the European Union statistical information - Eurostat.
- Descriptive statistics: the quantitative synthesis of psychosocial and behavioural phenomena. Uni- and bivariate analysis.
- Introduction to statistical inference.

Applying knowledge and understanding

- Statistical knowledge as interdisciplinarity.
- Recognizing and integrating data with other information sources.
- Basic skills in data analysis techniques, in particular with the package IBM SPSS, with mention to open source packages.
- Essential elements for the quantitative analysis of situations and phenomena.
- Statistical premises and procedures.
- Computation or estimation of statistical measures with software. Elaboration and understanding of analytical results.
- In official statistics, metadata recovering and data quality assuring.

- UN Sustainaible Development Goals in official statistics.
- Critical reading of numerical information as reported in the media.

Contents

The course provides students with theoretical knowledge and analytical tools for processing qualitative and quali-quantitative data. Methods for data production are explored with reference to official domestic statistics as part of the Eurostat network. The operationalization of concepts and phenomena, the identification of their measurement scales are explained with reference to multidisciplinary fields, in the first place referred to acquired undergraduate courses. The didactic promotes self-directed learning in statistical-computational reasoning, in mastering basic data analysis skills and in accessing numerical information disseminated both by official agencies and in the media.
Embracing the didactical distinction between descriptive and inferential statistics, the course sketches also experimental statistics. So-called self-reported data are faced mainly in the context of participation and e-participation.

Detailed program

- Measurement scales.
- Data collection.
- Official statistics. Types of data collection and surveys.
- Data quality: concepts and definitions.
- Statistical variables. Graphical representation.
- Measures of synthesis and position. Herzel statistical synthesis.
- Variability and dispersion.
- Ratios and indexes. Composite indicators.
- Bivariate analysis. Contingency, Spearman and Pearson correlation.
- Principles of probability. Notable probability distributions. From population to samples.
- Inference: parametric and distribution-free hypothesis testing and related confidence intervals.
- Test of hypothesis on the population mean. One sample, two correlated samples and independent samples t-tests
- Test of hypothesis in bivariate analysis

Prerequisites

Base math: high school commonly shared knowledge.
Informatics: competencies related to the first-semester course are required. Specific mathematics and/or informatics support paths will be devised when needed.

Teaching methods

The course is blended learning. It includes methodological lessons, computer laboratory applications and online activities.

The first module develops along with two thematic modules. The first one concerns statistical methodology, with emphasis on the meaning and the rationale at the basis of analytical concepts, with specific attention to psycho-social topics. Computer-assisted practice transpose systematically this knowledge into applications, so as to set them into their context., by means of IBM Spss software together with open-source packages for statistical computation. All computer-assisted practice are frontal and in person, as well as first and last theoretical lessons, while the other theoretical ones are frontal in streaming.

Mastering access to official statistics is at the core of the second thematic module, with Istat as a node of the Eurostat network, together with their open database. Official data are widely explored with reference to the pertaining disciplinary fields. Accessing the official statistical website, students practice how to retrieve the online documentation of interest, data quality assurance and metadata. Web conferences face the methodological aspects of official data, while hands-on activities allow navigating official data portals.

A section of the online activities consists of teamwork, exercises and simulations freely accessible on the e-learning platform, with the aim of harmonising the two modules. namely setting theoretical knowledge into the current publicly available data information. From the teaching point of view, mastering this competence enables to debate the huge data flow coming from all media, also in the light of the official statistical production. This debate takes place in groups of students based on issues and topics at the base of their personal interest.

Lessons will be held in the classroom as scheduled in the blended learning programme.

Assessment methods

The assessment is composed of two parts, related to the two modules of the course. The computerised exam on the first module provides two thirds of the final evaluation, the project on the second modul one third.

A computerised assessment concerns the first module. It consists of a comprehensive basic statistical analysis, both descriptive and inferential, on a data set that simulates a simple real survey. The step-by-step solution to the exercises is performed by means of IBM Spss and it requires the mastery of the basic software functions. Answers are provided as numerical closed or multiple-choice quizzes. The latter is complemented with some punctual questions on key methodological aspects., to ascertain the conceptual understanding and the problem-solving attitude. The computerised examination is completed with the production of statistical graphs, due to their relevance in nowadays data information.

Generating a personal project work on data communication is the assessment of the second module. Moving from the topics debated and even from other courses, each student develops a communication scheme of a topic from available data. A related database from official statistical institutes is reckoned in terms of methods and metadata. It is then compared to the data flow coming from the media, in critical reading. Then the chosen official statistical topic is critically compared with current general information. Some preparatory assignments on the e-learning platform are required, with no selective evaluation, to complete the project work.

An oral examination takes place either at the student's or the instructor's request, with a possible increase or decrease in the evaluation of the written exam of 3 points.

Textbooks and Reading Materials

Aron, A., Coups, E.J., Aron, E.N. (2018). *Fondamenti di Statistica. Introduzione alla Ricerca in Psicologia*. Pearson Editore. ISBN: 9788891905185. Digital edition: ISBN9788891911841.

Websites and other learning material as indicated by instructors.

Although this course is held in Italian, for Erasmus students, course material is available ialso n English, and students can sit the exam in English if they wish.

Sustainable Development Goals

GENDER EQUALITY | PEACE, JUSTICE AND STRONG INSTITUTIONS