



UNIVERSITÀ
CATTOLICA
del Sacro Cuore

Quantitative methods for social sciences

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Course aims and intended learning outcomes

The main aim of the course is to make students familiar with quantitative analyses and statistical tools in order to better understand economic, political, sociological and historical phenomena. In other words, students will learn that statistics is the “art and science of learning from data”.

Knowledge and understanding

At the end of the course, students will have basic knowledge of univariate and bivariate statistics. In addition, simple regression and inference analysis topics will allow students to read and interpret empirical analyses in scientific papers.

Applying knowledge and understanding

Topics learnt in this course will be useful for other disciplines whenever the quantitative approach is applied. This is particularly useful in a multidisciplinary perspective in the spirit of the School of Political and social sciences.

Thanks to Excel and GeoDa use, students will be able to manage electronic spreadsheets; to create tables and appropriate graphs and maps in order to synthetize and to visualise data; to compute synthetic indexes. Thanks to these skills, students will be able to comment empirical analyses and to produce statistical analyses for papers and other exams including quantitative sections.

Course content

The course topics will be the following:

- a. types and dimensions of data (i.e. nominal, ordinal and cardinal variables);
- b. univariate statistics:
 - frequency tables and statistical indexes (i.e. central measures as mean, median and mode); measures of dispersion (i.e. variance and standard deviation); measures of distribution (e.g. percentiles),
 - graphing (i.e. histograms, pie charts, trend lines) and new trends in infographics (e.g. Statista);
- c. bivariate statistics:
 - contingency tables;
 - Pearson and Spearman correlations indexes;
- d. simple regression analysis:
 - linear relationship between two variables;
 - OLS regression analysis;
- e. basic concepts of sampling distribution and inference analysis:
 - samples and population;
 - probability and probability distribution;
 - sampling distribution
 - inferential statistics:
 - point estimate and confidence intervals;
 - testing hypothesis.



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Univariate and bivariate statistics will be computed also using Excel spreadsheet and Geoda.

Reading list

- A. AGRESTI-C. FRANKLIN-B.KLINGENBERG, *Statistics: The Art and Science of Learning from Data*, Pearson New International Edition, 2014 (3rd edition).
- J. WALKENBACH, *Excel 2016 bible*, Indianapolis, IN: Wiley, 2015.
- L. ANSELIN, *GeoDa documentation*, available online <https://geodacenter.github.io/documentation.html>

Teaching method

The teaching method includes lectures and practical tutorials in pc lab (students will also have the opportunity to use their own personal computers).

Lectures will be 4 hours per week in both semesters: 2 hours lectures, 2 hours in lab.

If necessary extra hours will be scheduled and notice will appear on Blackboard.

During lectures, theoretical topics will be exploited using also numerical examples, which are provided and solved during classes.

The first semester lab lectures will be devoted to learn how to use the common spreadsheet (i.e. Excel for Office); while the second semester lab lectures will be devoted to learn how to use GeoDa, a freeware software for statistical mapping.

Students are invited to practice with homework exercises continuously in order to keep track of their understanding.

Slides will not be provided in advance to force students to be actively involved during lectures. Hence lecture slides will be provided on Blackboard at the end of each topic.

Assessment method and criteria

The final exam can be performed according to two procedures: an “ongoing evaluation” and a “final evaluation” procedure.

The ongoing evaluation procedure includes: 4 assignments using Excel and Geoda (2 assignments in each semester) to be uploaded on Blackboard; a first partial written exam at the end of the first term (e.g. January or February 2020); a second partial written exam at the end of the second term (e.g. end of May 2020).

In written exams, questions will include both exercises and definitions of theoretical concepts.

The final mark is defined as follows: each ongoing assignment is 5% of the final mark, each partial written exam is 40% of the final mark.

Even if the attendance is not compulsory, a constant attendance is highly recommended to better understand theoretical topics.

In order to sit on the first partial written exam, each student must perform each assignment in the first semester, otherwise no partial exam can be performed.

Students failing the first partial written exam will not be able to sit for the second partial written exam and their marks on the ongoing assignments will expire.

Incomplete deliver of all assignments will impede to sit in the partial written exams and the final evaluation according to the ongoing evaluation procedure.



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Once the ongoing evaluation procedure is complete, starting from June to July 2020, final marks will be filed only if students are registered in one of the official exam dates (i.e. Appelli ufficiali) as displayed on the I-catt portal.

Alternatively, each student could follow the final evaluation procedure, sitting in one of the official exam dates (i.e. Appelli ufficiali) starting from June 2020 on and whose dates will be displayed on the I-catt portal.

According to this procedure, a final written exam will include exercises and definitions of theoretical concepts covered during the first and second term, and Excel or GeoDa questions.

Notes and prerequisites

This is an introductory course and no prerequisites are necessary.

During the course economic examples will be provided, hence attending both courses jointly will complete the understanding.

Office hours is Friday 15.00 – 17.00 room 512, via Necchi 5, fifth floor.

Please check on the personal web page any cancellation of office hours.