# Quantitative methods for social sciences

## Prof. Teodora Erika Uberti

***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:

– types and dimensions of data (i.e. nominal, ordinal and cardinal variables);

– 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);

– bivariate statistics:

* + contingency tables;
	+ Pearson and Spearman correlations indexes;

– simple regression analysis:

* + linear relationship between two variables;
	+ OLS regression analysis;

– 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.

We use Excel spreadsheet to compute univariate and bivariate statistics and the open source software Geoda to produce thematic maps.

***READING LIST[[1]](#footnote-1)***

A. Agresti-C. Franklin-B.Klingenberg, *Statistics: The Art and Science of Learning from Data,* Pearson New International Edition, 2014 (3rd edition). [*Acquista da VP*](https://librerie.unicatt.it/scheda-libro/agresti-franklin/statistics-the-art-and-science-of-learning-from-data-global-ed-9781292164779-249278.html)

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 using personal pc.

Lectures will be 4 hours per week in both semesters: 2 hours lectures, 2 hours lab. Lectures will be face to face, while lab lecture will be provided exclusively online in live streaming. In both cases, lectures will be recorded and available for the academic year.

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* is defined as follows:

* 1 assignment using Excel in the first semester (about half November) to be uploaded on *Blackboard* (*6% of the final mark*);
* 1 assignment using Excel at the end of the first semester (about mid-December) to be uploaded on *Blackboard* (*6% of the final mark*);
* 1 partial written exam at the end of the first term (e.g. February 2022), *40% of the final mark*. In order to sit on the first partial written exam, each student must perform both assignments in the first semester, otherwise no partial exam can be performed.
* 1 Geoda assignment in the second semester to be uploaded on *Blackboard* (*8% of the final mark*);
* 1 partial written exam at the end of the second term (e.g. end of May 2022), *40% of the final mark*.

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

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*.

Once the *ongoing evaluation procedure* is complete, starting from June to July 2022, final mark 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 and the personal page of the professor.

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

Alternatively, each student could follow the *final evaluation* procedure, sitting in one of the official exam dates (i.e. *Appelli ufficiali*) starting from June 2021 on and whose dates will be displayed on the I-catt portal and the personal page of the professor.

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.

In the second semester all students are invited to participate to a video competition, whose winner groups will get an extra point on the final mark.

In case the current Covid-19 health emergency does not allow frontal teaching, remote teaching and assessment will be carried out following procedures that will be promptly notified to students.

***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 Wednesday 12.00 – 14.00 (CET) room 512, via Necchi 5, fifth floor or online (using Microsoft Teams or Cisco Webex).

Please check on the personal web page and *Blackboard* any cancellation of face to face office hours.

1. I testi indicati nella bibliografia sono acquistabili presso le librerie di Ateneo; è possibile acquistarli anche presso altri rivenditori. [↑](#footnote-ref-1)