
Applied Statistics

Professor: Roger Pagà
Office hours: upon request
Course Type: Compulsory
Credits: 3 ECTS
Term: First

Course Description

Evidence-based management refers to the intuitive yet powerful idea of using hard evidence to make better-informed managerial decisions. And what constitutes a source of hard evidence for those managers that need to make decisions? The answer is data, and the analysis of data. This is where statistics comes into play.

In this course, students will be introduced to a variety of statistical techniques and models that will allow them to analyse and draw conclusions from different types of data. Primarily, the types of data that are commonly obtained when conducting quantitative research (surveys, experiments, etc.).

The course will start by explaining how to analyse and interpret variables *individually* (calculating means, standard deviations, histograms...). However, the course will particularly emphasize the study of potential *relationships* between variables. For example: if a consumer has this or that profile, is he/she more or less likely to want to buy a sustainable product? To analyse and interpret the potential relationship between variables, the course will introduce several models of statistical *dependency* such as ANOVA, regression, or conjoint analysis.

The course will assume the need of having to use samples in order to draw conclusions about much larger populations (standard situation in most quantitative research projects). This means that the course will focus on *inferential* statistics and will therefore introduce concepts such as confidence intervals and hypotheses testing.

Lastly, the course will also cover some situations in which relying on qualitative data collection methods (example: a focus group) is advantageous. The course will provide an introduction on how to analyse and interpret that kind of data as well.

After the course is over students will have both a theoretical and practical understanding of dependency-based inferential statistical techniques, as well as qualitative data analysis techniques. Students will find this useful when working on research projects, both in the context of the Master's programme, and in their future professional life.

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Objectives and competences

- 1) Obtaining relevant descriptive statistics and charts from a dataset and understanding how to interpret them.
- 2) Understanding the importance of confidence intervals and hypothesis testing when using samples to draw conclusions about larger populations.
- 3) Understanding which dependence statistical techniques are better suited to analyse a dataset, how to perform them, and how to interpret the results.
- 4) Understanding the importance of qualitative research techniques and how to analyse and interpret qualitative data.

Methodology

The course will follow a 'learning by doing' approach. In each session, the professor will present students with a dataset that will serve to illustrate the advantages and scope of a particular statistical technique. Then, the professor will show students how to analyze those datasets using software. Students will be performing the same analyses as the professor on their computers, familiarizing themselves with the process. Then, the professor will show students how to interpret the output of those analyses and what practical conclusions can be drawn from them. The goal is that by the end of the course students can autonomously analyze and interpret similar datasets as those seen in the course.

Evaluation criteria

The final grade for the course is split as such:

- In-group assignments involving the analysis and interpretation of datasets: **30%**
- Class participation: **10%**
- Final exam: **60%**

Students need to obtain a **minimum of 4 in the final exam** to pass the course. This condition applies to both the regular exam and the retake exam. The final course grade of students that do not obtain a minimum of 4 in the exam will be the *minimum* between 4 and the final grade computed from the different evaluation elements (with the weights set above).

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Students that fail the evaluation of the course will have a retake exam opportunity that will be programmed in accordance with the academic calendar. If a student has to retake the exam, his **maximal grade for the course will be a 5**.

Students are required to attend 80% of classes. Failing to do so without justified reason will imply a Zero grade in the participation/attendance evaluation item and may lead to suspension from the program.

Students who fail the course during the regular evaluation are allowed ONE re-take of the evaluation, in the conditions specified above. If the course is also failed after the retake, the student will have to register again for the course the following year.

In case of a justified no-show to an exam, the student must inform the corresponding faculty member and the director(s) of the program so that they study the possibility of rescheduling the exam (one possibility being during the “Retake” period). In the meantime, the student will get an “incomplete”, which will be replaced by the actual grade after the final exam is taken. The “incomplete” will not be reflected on the student’s Academic Transcript.

Plagiarism is to use someone else’s work and to present it as one’s own without acknowledging the sources properly. All essays, reports or projects handed in by a student must be original work completed by the student. By enrolling at any UPF-BSM Master of Science and signing the “Honor Code,” students acknowledge that they understand the schools’ policy on plagiarism and certify that all course assignments will be their own work, except where indicated by correct referencing. Failing to do so may result in automatic expulsion from the program.”

Calendar and Contents

DATE	TOPIC	ACTIVITY/READINGS
10/10/22	<ul style="list-style-type: none"> - Brush up on variable types - Obtaining and interpreting descriptive statistics and charts 	Excel practice on the topics covered
17/10/22	<ul style="list-style-type: none"> - An introduction to hypothesis testing - T-tests and Chi-square tests 	Assignment 1
24/10/22	<ul style="list-style-type: none"> - Running and interpreting ANOVA models 	Excel practice on the topics covered Assignment 2

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07/11/22	- Running and interpreting linear regression models (I)	Excel practice on the topics covered
14/11/22	- Running and interpreting linear regression models (II): conjoint analysis	Assignment 3
21/11/22	- Running and interpreting logistic regression models (I)	Excel practice on the covered topics
28/11/2022	- Running and interpreting logistic regression models (II) - When quantitative data analysis is not enough: when and how to conduct qualitative data analysis	Excel practice on the covered topics Focus group data analysis example
12/12/2022	- Course summary and preparation for the final exam	
19/12/2022	- Final Exam	

Reading Materials/ Bibliography/Resources

- Lind, D. A., Marchal, W. G., & Wathen, S. A. (2017). *Statistical techniques in business & economics*. McGraw-Hill Education.
- Klibanoff, P., Sandroni, A., Moselle, B., Saraniti, B. (2005) *Managerial Statistics: A Case-Based Approach*. Thomson South-Western.
- Moore, D. S., Notz, W. I., Fligner, M. A. (2011) *The Basic Practice of Statistics* 6th Edition. W. H. Freeman and Company.

Bio of Professor

Pagà, Roger is a Lecturer at UPF Barcelona School of Management (UPF-BSM). He has served as the academic coordinator of the M.Sc. in Marketing at UPF-BSM. Before joining UPF-BSM's core faculty, he collaborated with Toulouse Business School as a lecturer. He teaches both at UPF-BSM and at ESCI-UPF School of International Studies. His courses cover a broad set of topics within the area of marketing, ranging from consumer behaviour, to market research, to data analysis. His scientific work places special emphasis in the areas of consumer behaviour, social psychology, and decision-making. He is also involved in knowledge transfer activities about the circular economy (Mercadona Chair in Circular Economy). He holds a PhD in Economics, Finance and Management from UPF.

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Note: This document is for informational purposes only. Some contents may change. Students will be duly informed. **4**