Applied Statistics

Professor: Walter Garcia-Fontes
Office hours: (by appointment) Tuesdays 4:30pm-6:30pm

Teaching assistant: Roger Pagà

Course Description

Firms in all sectors are developing new methods to gain competitive advantage, and the use of real time data and computing is basic nowadays for data-driven decision making. In this course we will work together to analyse and interpret data about markets and costumers. In this course, future managers or scholars who need knowledge about marketing, finance, consulting, strategy or operations will find different tools that will be useful in their future careers.

The learning objectives of the course are the acquisition and use of competences consisting of or related to:

- The data analysis process, the role of the data analyst, the value of data and its relation with business models

- The R programming language as a tool to analyse and use complex data to take business decisions

- Probability tools and concepts for statistical decision making

- Implementing sampling design, confidence intervals and hypothesis tests

- Correlation, regression and causality and limitations, the impact of data on regression findings, explanatory and predictive analysis

- Basic times series analysis

- Effective communication, which involves clearly articulating the points and selling those ideas. In this course, communication skills are developed through the practice of disciplined data-driven story-telling in course projects.

Competences

General competences

GC1: Possessing and understanding state of the art knowledge that provides a basis for analyzing various managerial issues

GC2: Teach students knowledge and problem-solving skills in order to tackle managerial issues in a broad (or multidisciplinary) manner

GC4: Teach students to communicate to non-specialized audiences in a clear and unambiguous manner.

Specific competences

SC2. To learn to apply the instruments and tools of quantitative analysis, based on statistics and mathematics, necessary to conduct research in the field of business.

SC3. To apply analytical and research techniques in the service of solving managerial problems

SC4. Acquire the skills required to design and implement problem-solving models based on insights from the social sciences

Learning outcomes

LO1. To master the quantitative tools of both statistics and mathematics that are used in the different subjects taught in the master's degree with special emphasis on their use for decision making in complex business environments.

LO2. Acquire advanced knowledge of theory and practice related to the main areas of business decision-making.

LO3. To deepen in the key areas of management from the point of view of analytical rigour.

Teaching and learning methods

Before lectures, students read and review teaching material and cases, and follow some R and data analysis tutorials.

All these activities are followed by short quizzes that are taking into account in the course assessment.

Lectures consist of case discussion, tutorials to practice real-world data analysis skills, games and demonstrations. Tutorials are dedicated to solve statistical written exercises and practice R programming skills.

After the lectures, weekly assignments are announced, and they have to be turned in for seminars, where they are going to be discussed.

Assessment strategy

Different learning activities are set up during the course, and they are assessed according to the following breakdown:

- 35% based on course assignments

- 5% on completion of videos and tutorial quizzes

- 20% midterm

- 40% final exam (The midterm discarded if the final exam has a higher grade, in which case the final exam counts 60% and the midterm counts 0%)

Students are required to attend 80% of classes, including also online classes when it applies. Failing to do so without justified reason may lead to suspension from the program.

As with all courses taught at the UPF BSM, students who fail the course during regular evaluation will be allowed ONE re-take of the examination/evaluation. Students that pass any Retake exam should get a **5 by default as a final grade for the course.** If the course is again failed after the retake, students will have to register 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 another's work and to present it as one's own without acknowledging the sources in the correct way. 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."

Instructor roles

Professor: All matters related to the lectures, exams and general issues in the course should be directed to me.

Teaching Assistant: Questions about seminar sessions and grading of assignments should be directed to the teaching assistant.

Communication procedures

For general topics the preferred way of asking is in the Support Forum at the learning on-line platform. For personal matters (grading and personal issues in the course such as missing assignments or absences) should be addressed by personal email, which will be answered within 24 hours. You are also welcome during the office hours (Tuesdays 4pm-6pm, ask for an online appointment via email) for any matter related with the course.

Classroom etiquette

Inappropriate or disruptive classroom behaviour will not be tolerated. Web surfing or use of electronic devices in a disruptive manner may imply possible removal from the class. Please silence your cell phones before class starts.

If you have to arrive late, leave the classroom and return, or leave before the class ends, tell it beforehand to the instructor.

Laptops will be used in class. Disruptive web surfing or other use of laptops or other electronic devises is not allowed.

Calendar and contents (tentative, to be adjusted)

Week			Topic/content	Reading
1 (Sep 30)	Day 1		Origins of data	DA, Chapter 1
(Oct 1)	Day 2		Preparing data for analysis	DA, Chapter 2
2 (Oct 7-8)	Day 1	Data Exploration	Exploratory data analysis (I)	DA, Chapter 3
	Day 2		Exploratory data analysis (II)	DA, Chapter 3
3 (Oct 14-15)	Day 1		Comparison and correlation (I)	DA, Chapter 4
	Day 2		Comparison and correlation (II)	DA, Chapter 4
4 (Oct 21-22)	Day 1		Generalizing from data (I)	DA, Chapter 5
	Day 2		Generalizing from data (II)	DA, Chapter 5
5 (Oct 28-29)	Day 1		Testing hypothesis (I)	DA, Chapter 6
	Day 2		Testing hypothesis (II)	DA, Chapter 6
6 (Nov 4-5)	Day 1*		Midterm	
	Day 2		Simple regression (I)	DA, Chapter 7
7 (Nov 11-12)	Day 1	Regression Analysis	Simple regression (II)	DA, Chapter 7
	Day 2		Complicated patterns and messy data	DA, Chapter 8
8 (Nov 18-19)	Day 1		Generalizing results from regression (I)	DA, Chapter 9
	Day 2		Generalizing results from regression (II)	DA, Chapter 9
9 (Nov 25-26)	Day 1		Multiple regression (I)	DA, Chapter 10
	Day 2		Multiple regression (II)	DA, Chapter 10
10 (Dec 2-3)	Day 1		Modeling probabilities	DA, Chapter 11
	Day 2**		Regression with time series	DA, Chapter 12

Note: DA - Békés, G., & Kézdi, G. (2021). *Data Analysis for Business, Economics, and Policy*.
Cambridge: Cambridge University Press.
* Midterm content will be adjusted according to topics covered in class
** Time series will be covered if there is time.

Class tasks

Some data sets are analyzed in class, and the results are uploaded to the class platform

Midterm and Final Examination

We will have a midterm around half way into the term, the exact date and time is shown in the calendar above. It is going to be a one and a half hour test. It counts for 20% of the grade. The final exam will be held on the exam week in December, date and time will be announced, and it counts for 40%. If you get a better grade in the final exam, the grade of the midterm exam is discarded and the final exam counts 60%. See all other evaluation criteria at the evaluation section.

Both the final and the midterm exam will be open book exams, you can consult your notes or any other material.

Reading Materials/ Bibliography/Resources

We will follow closely the following textbook:
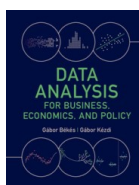
 Békés, G., & Kézdi, G. (2021). *Data Analysis for Business, Economics, and Policy*. Cambridge: Cambridge University Press.

We will use R and R-Studio software, available at the computer labs at the school. A free-version to install in personal computers is available, see the course E-campus page.

We will manage all assignments and course material through the on-line learning platform, E-Campus.

Bio of Professor

Walter Garcia-Fontes joined the Department of Economics and Business after getting his Ph.D. in Economics at Stanford Universtiy (1992). He held the Dean of Undergraduate Studies at the School of Economics and Business of Universitat Pompeu Fabra from 2015 until 2024. His research interests are in industrial organization, corporate innovation, technological change, applied econometrics and the economics of education. He has published his research in leading international field journals. He has coordinated various projects in different European Commission Framework Programmes, studying the European chemical industry and the organizational changes related to new industrial relations.