Master's degree in Statistics and Operations Research

SCHOOL OF MATHEMATICS AND STATISTICS (FME)

The aim of the **UPC-UB interuniversity master's degree in Statistics and Operations Research** (**master's degree website**) is to provide graduates with advanced knowledge of the theory and methods of current statistics and operations research. Integrated into multidisciplinary working groups, students who successfully complete this master's degree course will be able to apply the skills acquired in areas such as healthcare, services, industry, business, science and government agencies. They will also be provided with research-focused training to help them gain access to the doctoral degree.

GENERAL DETAILS

Duration and start date
  1.5 academic years, 90 ECTS credits. Starting September

Timetable and delivery
  Afternoons. Face-to-face

Fees and grants
  Approximate fees for the master's degree, **excluding other costs** (does not include non-teaching academic fees and issuing of the degree certificate):
  €1,743 (€4,050 for non-EU residents).
  More information about fees and payment options
  More information about grants and loans

Language of instruction

  Check the language of instruction for each subject in the course guide in the curriculum.

  Information on language use in the classroom and students' language rights.

Location

  School of Mathematics and Statistics (Barcelona)

  Faculty of Economics and Business (UB) Av. Diagonal, 690-696 08028 Barcelona

Official degree
  Recorded in the Ministry of Science, Innovation and Universities

ADMISSION

General requirements
  Academic requirements for admission to master's degrees

Specific requirements

  The content of the degree is appropriate for graduates of bachelor's degrees that include statistics or operations research subjects. Candidates will ideally have taken a bachelor's degree and will be interested in solving problems, have an aptitude for mathematics and be skilled communicators. The academic structure of the master's degree includes homogenisation courses in the first semester and the possibility of taking specific pathways in accordance with prior learning. The aim is to promote the entry of students from different academic backgrounds. Holders of the following qualifications may be considered:

- Bachelor's degree in Statistics
- Bachelor's degree in Mathematics
- Bachelor's degree in Biology/Physics/Biotechnology
- Bachelor's degree in Economics/Actuarial Sciences
- Bachelor's or pre-EHEA degree in Industrial Engineering or other engineering fields
- Bachelor's degree in Informatics Engineering
- Bachelor's degree in Psychology/Sociology
- Diploma in Statistics, taking a minimum of 30 credits in the form of bridging courses.

Admission criteria

To decide on whether students are suitable for the master's degree in Statistics and Operations Engineering, their curriculum vitae and prior training will be considered, together with their stated interests, in order to guarantee that the aims of the Master's Degree can be fulfilled in a reasonable time and with a reasonable degree of effort.

The elements that will be taken into account for this evaluation will be:

- Weighting of the academic record.
  - Applicants should attach a scanned copy of their curriculum vitae, an official academic certificate issued by their school of origin stating the weighted mark of their academic transcript (NPE) on a scale of 1 to 10.
  - If when pre-enrolment takes place the student has not yet finished their course of studies, the certificate should refer to courses taken and passed up to the date of issue of the certificate.
  - If no certifying document is attached, the NPE will be taken to be 5.
- Accredited education.
  - Applicants should specify the academic qualification they have obtained or they expect to have obtained when enrolling.
  - If this qualification has already been obtained, a scanned copy of either the certificate or the receipt for payment for this certificate should be attached to the applicant's curriculum vitae.
  - The original of the certificate or the receipt must be presented on formal enrolment in the course.
- Aspects of the curriculum vitae related to statistics and/or operations research in the professional, teaching or scientific spheres.
- In particular, prior academic training, qualifications obtained and professional experience will be taken into account.
- Knowledge of English.
  - This knowledge will be accredited by attaching a scanned version of the highest level qualification or certificate obtained to the applicant's curriculum vitae.
  - Without this accreditation, this item will not be taken into account when evaluating the student's application.
- Dedication to the course of studies and whether it is to be combined with a job.

Places
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Pre-enrolment
Pre-enrolment period open.
Expected deadline: 15/05/2026.

[How to pre-enrol](#)

Enrolment
[How to enrol](#)

Legalisation of foreign documents
All documents issued in non-EU countries must be legalised and bear the corresponding apostille.

CURRICULUM		
Subjects	**ECTS credits**	**Type**
FIRST SEMESTER		
Models and Methods in Operations Research	5	Compulsory

Subjects	ECTS credits	Type
Statistical Software: R and SAS	5	Compulsory
Advanced Statistical Inference	5	Optional
Clinical Trials	5	Optional
Continuous Optimisation	5	Optional
Data Analysis in Bioinformatics	5	Optional
Econometric Analysis	5	Optional
Fundamentals of Bioinformatics	5	Optional
Fundamentals of Statistical Inference	5	Optional
Lifetime Data Analysis	5	Optional
Linear and Generalised Linear Models	5	Optional
Mathematics	5	Optional
Optimisation in Data Science	5	Optional
Optimisation in Energy Systems and Markets	5	Optional
Risk Quantification	5	Optional
Simulation	5	Optional
Spatial Data Analysis	5	Optional
Spatial Epidemiology	5	Optional
Statistical Programming and Databases	5	Optional
Statistics for Business Management	5	Optional
SECOND SEMESTER		
Actuarial Statistics	5	Optional
Advanced Survival Analysis	5	Optional
Bayesian Analysis	5	Optional
Discrete Network Models	5	Optional
Epidemiology	5	Optional
Financial Statistics	5	Optional
Genetic Epidemiology	5	Optional
Large Scale Optimisation	5	Optional
Longitudinal Data Analysis	5	Optional
Machine Learning	7.5	Optional
Multivariate Data Analysis	5	Optional
Omics Data Analysis	5	Optional
Probability and Stochastic Processes	5	Optional
Quantitative Finance	5	Optional
Quantitative Marketing Techniques	5	Optional
Simulation for Business Decision Making	5	Optional
Social Indicators	5	Optional
Statistical Learning	5	Optional

Subjects	ECTS credits	Type
Statistical Learning with Deep Artificial Neural Networks	5	Optional
Statistical Methods in Clinical Research	5	Optional
Statistical Methods in Epidemiology	5	Optional
Stochastic Programming	5	Optional
Summer School Seminar III	3	Optional
Time Series	5	Optional
THIRD SEMESTER		
Master's Thesis	30	Project

PROFESSIONAL OPPORTUNITIES

Professional opportunities

Graduates of this master's degree will be experts who may be employed in healthcare, services, industry and business. They will apply the theory and methods of statistics and operations research in fields such as biostatistics, data engineering, marketing and finance, industrial statistics, optimisation in engineering and industry, and applications in transport engineering.

Competencies

Generic competencies

Generic competencies are the skills that graduates acquire regardless of the specific course or field of study. The generic competencies established by the UPC are capacity for innovation and entrepreneurship, sustainability and social commitment, teamwork, proper use of information resources, knowledge of a foreign language (preferably English) and gender perspective.

Basic competencies

- Graduates of this degree will have acquired the knowledge that serves as a basis or opportunity for developing and applying original ideas, often in a research context.
- They will know how to apply the knowledge acquired and their problem-solving abilities in new or unfamiliar settings within wider (or multidisciplinary) contexts related to their field of study.
- They will be able to integrate their knowledge and deal with the complexity of making judgements on the basis of information that, although incomplete or limited, includes reflection on the social and ethical responsibilities related to the application of their knowledge and judgements.
- They will be able to clearly and unambiguously communicate their conclusions—and the knowledge and reasons that support them—to specialised and non-specialised audiences.
- They will have acquired learning skills that will enable them to continue studying in a largely self-directed or autonomous manner.

Generic competencies

- A capacity for carrying out activities that involve applying theoretical and methodological knowledge and statistical and operations research techniques using teamwork and other skills expected of graduates.
- A capacity for identifying the most appropriate statistical and operations research methods for analysing the information that is available at any given moment, in order to respond to problems and dilemmas that arise and to inform decision making.
- An awareness of the need to observe professional ethics and rules on data and statistical secrecy protection.

Specific competencies

- A capacity for designing and managing the gathering, coding, handling, storage and processing of information.
- A capacity for mastering the terminology belonging to a field in which statistical and operations research models and methods are applied to solve real problems.

- A capacity for formulating, analysing and validating models that are applicable to practical problems. A capacity for selecting the most appropriate statistical and operations research method or technique for applying models to concrete situations or problems.
- A capacity for using various inference procedures to answer questions, identifying the properties of different estimation methods and their advantages and disadvantages and adapting these methods to a concrete situation in a specific context.
- A capacity for formulating and solving real decision-making problems in various areas of application and selecting the most appropriate method and optimisation algorithm in each case.
- A capacity for choosing the most suitable software to carry out the calculations necessary to solve a problem.
- A capacity for understanding advanced statistics and operations research articles. Familiarity with research procedures for the production and transmission of new knowledge.
- A capacity for discussing the validity, scope and relevance of solutions and presenting and defending their conclusions.
- A capacity for implementing statistics and operations research algorithms.

QUALITY ACCREDITATION

Check the degree's main quality indicators in the University Studies in Catalonia portal of the Catalan University Quality Assurance Agency. Find information on topics such as degree evaluation results, student satisfaction and graduate employment data.

Further information

ACADEMIC ORGANISATION

UPC school

School of Mathematics and Statistics (FME)

Participating institutions

Universitat Politècnica de Catalunya (UPC) - **coordinating** university
Universitat de Barcelona (UB)

Academic coordinator

Mari Paz Linares Herreros (UPC)
Helena Chuliá (UB)

Academic calendar

General academic calendar for bachelor's, master's and doctoral degrees courses

Academic regulations

Academic regulations for master's degree courses at the UPC

MASTER'S DEGREE WEBSITE