

Course guide

200622 - EGE - Statistics for Business Management

Last modified: 01/06/2023

Unit in charge: School of Mathematics and Statistics
Teaching unit: 1004 - UB - (ENG)Universitat de Barcelona.

Degree: MASTER'S DEGREE IN STATISTICS AND OPERATIONS RESEARCH (Syllabus 2013). (Optional subject).

Academic year: 2023 **ECTS Credits:** 5.0 **Languages:** Spanish, English

LECTURER

Coordinating lecturer: CATALINA BOLANCÉ LOSILLA

Others: Primer quadrimestre:
CATALINA BOLANCÉ LOSILLA - A
MONTserrat GUILLEN ESTANY - A

PRIOR SKILLS

Knowledge of basic statistics: exploratori data analysis, inference. Interest in knowing how and where statistics can provide a valuable contribution in business environments. 60% of lectures, reading materials and presentations and exams are in English, 40% of lectures are in Spanish

REQUIREMENTS

Basic knowledge of data analysis, probability models and inference: Exploratory data analysis and graphical representations. Basic concepts of probability models (normal distribution, binomial and poisson). Basics inference. Knowledge can be acquired in any basic statistics text book.

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

5. CE-2. Ability to master the proper terminology in a field that is necessary to apply statistical or operations research models and methods to solve real problems.
 6. CE-3. Ability to formulate, analyze and validate models applicable to practical problems. Ability to select the method and / or statistical or operations research technique more appropriate to apply this model to the situation or problem.
 7. CE-5. Ability to formulate and solve real problems of decision-making in different application areas being able to choose the statistical method and the optimization algorithm more suitable in every occasion.
- Translate to english

Transversal:

1. SUSTAINABILITY AND SOCIAL COMMITMENT: Being aware of and understanding the complexity of the economic and social phenomena typical of a welfare society, and being able to relate social welfare to globalisation and sustainability and to use technique, technology, economics and sustainability in a balanced and compatible manner.
2. TEAMWORK: Being able to work in an interdisciplinary team, whether as a member or as a leader, with the aim of contributing to projects pragmatically and responsibly and making commitments in view of the resources that are available.
3. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.
4. FOREIGN LANGUAGE: Achieving a level of spoken and written proficiency in a foreign language, preferably English, that meets the needs of the profession and the labour market.

TEACHING METHODOLOGY

Learning will be through a very practical approach. After a brief introduction to the key concepts, the topics will be explained through the study of actual cases and concrete examples. Cases such as 'The Silicone Tube Case' or 'The Case of the Professional Cooperative Bank' where additional information is handed out sequentially will be combined with examples from the book: 'The Role of Statistics in Business and Industry', which will be used as a basic reference.

LEARNING OBJECTIVES OF THE SUBJECT

The prime objective is to put into a business context the usefulness of the statistical techniques already known by the student, and to identify the benefits that their use can provide. Therefore at the end of the course the students must be able to:

- Identify the most suitable statistical tool in different business contexts and situations
- Assess the benefits that the use of this technique can bring to the organization
- Convince management (sale) of the advantages and benefits of the use of this particular technique

STUDY LOAD

| Type | Hours | Percentage |
|-------------------|-------|------------|
| Self study | 80,0 | 64.00 |
| Hours small group | 15,0 | 12.00 |
| Hours large group | 30,0 | 24.00 |

Total learning time: 125 h

CONTENTS

- Statistics: The why and the what. Data quality. Evolution of the use of statistics. Proactive statistics.

Description:

- Statistics in the company
- Internal and external data
- Current use of statistics

Full-or-part-time: 7h 30m

Theory classes: 4h 30m

Laboratory classes: 3h

- Statistics in other areas: marketing, customer management, financial services, process management

Description:

- Statistics applied to marketing
- Statistics applied to customer management
- Statistics applied to finance
- Statistics applied to process management

Full-or-part-time: 7h

Theory classes: 4h

Laboratory classes: 3h

- Selling statistics: internally and externally

Description:

- Sources of internal statistics
- Sources of external statistics
- Management of statistics

Full-or-part-time: 3h

Theory classes: 3h

- Data Science: Organizational and managerial aspects (roles and responsibilities). Valorization

Description:

- Importance and role of data science in business organizations
- Organization required
- Roles and responsibilities
- Relationship with statistics
- Relationship with business analytics (descriptive, predictive and prescriptive)
- Maturity models Main uses in different types of organizations
- Case studies

Specific objectives:

Understand the organizational aspects and the role of data science in companies.

Be able to assess the usefulness and role it can have in different organizations

Related activities:

Reading and discussion of articles in scientific and technical journals

Related competencies :

MESIO-CE3. CE-3. Ability to formulate, analyze and validate models applicable to practical problems. Ability to select the method and / or statistical or operations research technique more appropriate to apply this model to the situation or problem.

CT3. TEAMWORK: Being able to work in an interdisciplinary team, whether as a member or as a leader, with the aim of contributing to projects pragmatically and responsibly and making commitments in view of the resources that are available.

CT4. EFFECTIVE USE OF INFORMATION RESOURCES: Managing the acquisition, structuring, analysis and display of data and information in the chosen area of specialisation and critically assessing the results obtained.

Full-or-part-time: 6h

Theory classes: 3h

Laboratory classes: 3h

- The role of statistics in product design: Relationship between variability and customer satisfaction. Reducing variability, robust products. Planning tests (experiments).

Description:

- Statistics and product design
- Statistics and customer satisfaction
- Design of experiments, inference

Full-or-part-time: 9h

Theory classes: 6h

Laboratory classes: 3h

- Statistics in quality management. Planning, control and improvement.

Description:

- Statistical analysis in quality management
- Planning, control and quality improvement through statistics

Full-or-part-time: 6h

Theory classes: 4h

Laboratory classes: 2h

- Improvement programs: Six Sigma Methodology

Description:

- Six Sigma method
- Practical Example with R

Full-or-part-time: 6h 30m

Theory classes: 5h 30m

Laboratory classes: 1h

ACTIVITIES

RESOLUTION OF EXERCISES AND PROBLEMS

Description:

Students will be asked to do exercises and solve problems. This will be done individually or in groups, as indicated by the teacher in each case.

Specific objectives:

For the students to practice the knowledge acquired and for the teachers to get feedback about the level of assimilation and understanding of this knowledge.

Material:

The exercises and problem statements as well as their resolution, once commented in class, will be available on the intranet of the subject.

Delivery:

The exercises done by each student will be part of the continuous assessment

Full-or-part-time: 45h

Practical classes: 15h

Self study: 30h

READINGS AND PRESENTATIONS

Description:

For some topics students will be asked to read some chapters of the recommended book and papers related as a preparation of the corresponding lectures. In addition, they will be asked to discuss its contents or make presentations. This will be done individually or in groups, as indicated by the teacher in each case.

Specific objectives:

This will allow students to arrive to the lectures with some knowledge of the topic to be presented. Students will learn to get information directly from the sources and to practice transversal competencies

Material:

The chapters and papers listed will be available on the intranet.

Delivery:

The comments and presentations will be part of the continuous assessment

Full-or-part-time: 45h

Practical classes: 15h

Guided activities: 30h

RESOLUTION OF CASE STUDIES

Description:

Students should understand a case study that describes an industrial problem of real character. Using a database to be provided, should determine the appropriate statistical tools to answer the questions, using statistical software.

Specific objectives:

Acquiring skills in working with data and the use of statistical software packages. Identify appropriate statistical tools for each situation.

Material:

Students will have self-learning videos statistical software used to solve the cases, together with the statements of cases and databases on the intranet.

Delivery:

The evaluation is based on questionnaires solving cases in class discussion and, eventually, in the reporting.

Full-or-part-time: 35h

Practical classes: 15h

Self study: 20h

EXAM FIRST PART

Full-or-part-time: 1h 30m

Practical classes: 1h 30m

GRADING SYSTEM

$$NF = 0,6*AC + 0,2*E1 + 0,2E2$$

AC= Continuous evaluation. It will have two components. A 50% will be based on the practical cases, presentations and activities developed and the other 50% will be based in assessments (tests or short exams) conducted during regular lectures.

E1 = First part exam

E2 = Second part exam



EXAMINATION RULES.

Those of general application in the MESIO

BIBLIOGRAPHY

Basic:

- Hahn, G. J.; Doganaksoy, N. The Role of statistics in business and industry [on line]. Hoboken, N.J: Wiley, 2008 [Consultation: 07/07/2023]. Available on: <https://ebookcentral-proquest-com.recursos.biblioteca.upc.edu/lib/upcatalunya-ebooks/detail.action?pq-origsite=primo&docID=819142>. ISBN 9780471218746.
- Coleman, S [et al.]. Statistical practice in business and industry [on line]. Chichester: John Wiley & Sons, 2008 [Consultation: 07/07/2023]. Available on: <https://onlinelibrary-wiley-com.recursos.biblioteca.upc.edu/doi/book/10.1002/9780470997482#>. ISBN 9780470014974.
- Pande, P. S.; Neuman, R.P.; Cavanagh, R.R. Las Claves de seis sigma : la implantación con éxito de una cultura que revoluciona el mundo empresarial. Madrid: McGraw-Hill, 2002. ISBN 8448137531.
- Juran, J.M.; Godfrey, B. Juran's quality handbook. 5th ed. New York: McGrawHill, 1999. ISBN 007034003X.