Course guide
240336 - 240EO052 - Quantitative Methods for Business

Last modified: 23/05/2025

Unit in charge: Barcelona School of Industrial Engineering
Teaching unit: 732 - OE - Department of Management.

Degree: MASTER'S DEGREE IN SUPPLY CHAIN, TRANSPORT AND MOBILITY MANAGEMENT (Syllabus 2014). (Compulsory subject).
MASTER'S DEGREE IN MANAGEMENT ENGINEERING (Syllabus 2021). (Compulsory subject).

Academic year: 2025 **ECTS Credits:** 5.0 **Languages:** Spanish

LECTURER

Coordinating lecturer: Juanpera Gallel, Marc

Others: Gil Figuerola, Pol
Juanpera Gallel, Marc

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CEO3. Acquire concepts and techniques related to quantitative and experimental methods for analysis and decision making.
CEO4. Apply quantitative and experimental methods for decision-making in situations where intangibles appear.

Generical:
CGO4. Learn and master the analytical tools necessary for decision making in the organizational context more efficient.

Transversal:
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.

Basic:
CB7. (ENG) Que els estudiants sàpiguen aplicar els coneixements adquirits i la seva capacitat de resolució de problemes en entorns nous o poc coneguts dintre de contextos més amplis (o multidisciplinars) relacionats amb la seva àrea d'estudi.

TEACHING METHODOLOGY

The teaching methodology is divided in three parts:

- Face-to-face sessions of master classes
- Face-to-face sessions of practical work (exercises and problems)
- Autonomous study work

In the exposition sessions of the contents, the Professor will introduce the theory basis of the material, concepts, methods and results illustrating them with convenient examples to help its understanding.

In the class sessions of practical work, the Professor will guide the students in the application of the theory concepts to solve the problems, developing at all times the critical thinking. Exercises will be proposed to the student, and he or she will have to solve it in class and, if they are not finished, they will have to be carried out out of class, in order to favour the use of the basic tools for the resolution of problems.

The student, in an autonomous way, must work the contents of the coursse exposed by the Professor and the result of the practical work sessions to assimilate and fix the concepts

LEARNING OBJECTIVES OF THE SUBJECT

The course introduces the student to the modelling concepts, principles and basis by the linear and integer programming, the resolution of the linear and integer programming, the graph theory and the queuing theory, for the analysis and decision making in all types of contexts

STUDY LOAD

Type	Hours	Percentage
Hours large group	22,5	50.00
Hours small group	22,5	50.00

Total learning time: 45 h

CONTENTS

Module 1: Graph Theory

Description:
Concept. Terminology. Representation of graphs. Optimization exercises in graphs: minimum partial tree, extreme paths, optimal flows

Specific objectives:
Introduce the student to the concepts, principles and basis of the graph theory

Related activities:
Activity 1 (sessions of big groups/Theory), activity 2 (sessions of medium groups/exercises), activity 3 (partial exam) and activity 4 (final exam)

Full-or-part-time: 30h
Theory classes: 4h 20m
Practical classes: 6h 28m
Self study : 19h 12m

Module 2: Modelling by linear and integer programming

Description:
Concept of the mathematical program and linear program. Linear programs and mixed-integer linear programs. Modelling techniques.

Specific objectives:
Introduce the students to the concepts, principles and basis of the modelling by the linear and integer programming

Related activities:
Activity 1 (sessions of big groups/theory), activity 2 (sessions of medium groups/exercises), activity 3 (partial exam) and activity 4 (final exam)

Full-or-part-time: 50h
Theory classes: 7h 12m
Practical classes: 10h 48m
Self study : 32h

Module 3: Queuing Theory

Description:
Causes and cost of waiting. Classification of the systems with waits. Management of queues. Queuing theory: birth and death processes. Introduction to the queues network

Specific objectives:
Introduce the student to the concepts, principles and basis of the queuing theory.

Related activities:
Activity 1 (sessions of big groups), activity 2 (sessions of medium groups/exercises) and activity 4 (final exam)

Full-or-part-time: 7h 30m
Theory classes: 1h 05m
Practical classes: 1h 37m
Self study : 4h 48m

GRADING SYSTEM

The qualification of the student will be the following:

Final mark = max(0,6*Nef + 0,2*Npp; 0,8*Nef) + 0,2*Nco

Where:

Nef: Mark of the final exam
Npp: Mark of the partial exam
Nep: Mark of continuous learning

Reevaluation exam.
A written exam is performed on the date determined by the School. Only students who have suspended the subject can be presented (in any case a student that has passed can do the reevaluation exam). The test is similar to the final exam and replaces its marks.The student can carry all the material that he/she considers suitable, except computers and mobile phones.

EXAMINATION RULES.

For the partial and final evaluation of the course (Npp and Nef) a written test is carried out on the dates determined by the school. In both cases the student can bring all the material they deem appropriate, except computer, tablet, mobile phone and similar. The continuous grade will correspond to an evaluation of the student's learning throughout the course, focused mainly on practical activities.