Course guide
310509 - 310509 - Models and Decision Tools

Last modified: 09/05/2025

Unit in charge: Barcelona School of Building Construction
Teaching unit: 732 - OE - Department of Management.

Degree: MASTER'S DEGREE IN BUILDING CONSTRUCTION MANAGEMENT (Syllabus 2015). (Optional subject).

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

LECTURER

Coordinating lecturer: Sallan Leyes, Jose Maria

Others: Sallan Leyes, Jose Maria

PRIOR SKILLS

There are no prerequisites for the completion of this subject

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CE16MUGE. Integrate acquired competences in the building management field, for carrying out the final master project

Generical:
CG1MUGE. Apply the acquired knowledge in solving complex problems in any sector of the building management.
CG4MUGE. Analyse, evaluate and synthesise critically, the information to propose solutions or alternatives to situations arising from building management processes.

Transversal:
06 URI. EFFECTIVE USE OF INFORMATION RESOURCES. Managing the acquisition, structure, analysis and display of information from the own field of specialization. Taking a critical stance with regard to the results obtained.
05 TEQ. TEAMWORK. Being able to work as a team player, either as a member or as a leader. Contributing to projects pragmatically and responsibly, by reaching commitments in accordance to the resources that are available.

Basic:
CB10. The students must possess the learning abilities which allow them to continue studying in a way which should be to a large extent self-directed and autonomous.
CB8. The students must be able to integrate knowledges and front to the complexity to formulate opinions from an information which, being incomplete or limited, includes reflections about the social and ethical responsabilities linked to the application of their knowledges and opinions.
CB7. The students must be able to apply the acquired knowledges and their ability of resolution of problems in new or little known environments inside more wide environments (or multidisciplinary) related with their study field.
CB9. The students must be able to communicate their conclusions and the knowledges and ultimate reasons which support to specialised and non-specialised audiences in a clear mode and without ambiguities.

TEACHING METHODOLOGY

Master class
Expository / participatory class
Practices

LEARNING OBJECTIVES OF THE SUBJECT

In the current business environment, it is increasingly common to make decisions based on the analysis of data obtained from IT, as well as open data supports. In the context of construction industry, it is foreseeable that the analysis of the data obtained from the smart cities systems will be increasingly relevant.

For this reason, the objectives of the course are:
- Introduce the concept of business analytics for the support of decision making in the company
- Train the student to use data analysis tools, so that he / she is able to acquire and pre-process the data, analyze them and present the results of the analysis.
Introduce business analytics techniques to solve problems in the context of the construction industry.
- Train the student to learn to use other business analytics techniques autonomously.

STUDY LOAD

Type	Hours	Percentage
Hours small group	5,0	4.00
Hours large group	15,0	12.00
Guided activities	10,0	8.00
Hours medium group	5,0	4.00
Self study	90,0	72.00

Total learning time: 125 h

CONTENTS

Introduction and analytics tools

Description:
Introduction:
Models and decision-making tools and business analytics.
Descriptive, predictive and prescriptive analytics
Machine learning, data mining, big data

Introduction to R for business analytics:
Introducing R and RStudio
Basic functionalities: Data structures, file reading, expanding R with packages
Writing reports with R Markdown
Acquiring and cleaning data
Analysis of data with graphics
Statistical analysis of data: measures of dispersion and association

Full-or-part-time: 8h
Theory classes: 8h

Descriptive analytics techniques

Description:
Linear models:
Analyzing the relationship between dependent and independent variables with regression analysis
Linear regression with R
Results of the regression model.
Predictions with linear regression.

Generalized linear models:
Binary dependent variable: logit and probit models
Variable depending on count: Poisson and negative binomial models

Classification techniques:
Cluster analysis
Trees

Association rules

Full-or-part-time: 12h
Theory classes: 12h

Predictive analytics

Description:
Design of a prediction study: sets of training, test and validation.
Evaluation of prediction studies: ROC curves, sampling errors
Performing predictions with R: the empty package

Full-or-part-time: 10h
Theory classes: 10h

GRADING SYSTEM

The evaluation of the subject will be composed of the following parameters:

a) Continuous evaluation with practical cases: 70%
b) Exam: 30%