

## 310509 - Models and Decision Tools

Coordinating unit:	310 - EPSEB - Barcelona School of Building Construction		
Teaching unit:	732 - OE - Department of Management		
Academic year:	2019		
Degree:	MASTER'S DEGREE IN BUILDING CONSTRUCTION MANAGEMENT (Syllabus 2015). (Teaching unit Optional)		
ECTS credits:	5	Teaching languages:	Catalan, Spanish

### Teaching staff

Coordinator:	Sallan Leyes, Jose Maria
Others:	Sallan Leyes, Jose Maria

### Degree competences to which the subject contributes

#### 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 responsibilities 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.

#### 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.

### 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.

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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

Total learning time: 125h	Hours large group:	15h	12.00%
	Hours medium group:	5h	4.00%
	Hours small group:	5h	4.00%
	Guided activities:	10h	8.00%
	Self study:	90h	72.00%

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### Content

<p>Introduction and analytics tools</p>	<p>Learning time: 8h Theory classes: 8h</p>
<p>Description: Introduction: Models and decision-making tools and business analytics. Descriptive, predictive and prescriptive analytics Machine learning, data mining, big data</p> <p>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</p>	
<p>Descriptive analytics techniques</p>	<p>Learning time: 12h Theory classes: 12h</p>
<p>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.</p> <p>Generalized linear models: Binary dependent variable: logit and probit models Variable depending on count: Poisson and negative binomial models</p> <p>Classification techniques: Cluster analysis Trees</p> <p>Association rules</p>	



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Predictive analytics	Learning time: 10h Theory classes: 10h
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	

### Bibliography