Course guide
310508 - 310508 - Geographic Information Systems Applied to Urbanism and Building Construction (GIS and BIM)

Last modified: 29/12/2025

Unit in charge: Barcelona School of Building Construction
Teaching unit: 752 - RA - Departamento de Representación Arquitectónica.
751 - DECA - Department of Civil and Environmental Engineering.

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

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

LECTURER

Coordinating lecturer: Nuñez Andres, M Amparo

Others: Nuñez Andres, Maria Amparo

Gispert Irigoyen, Gustavo De

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:
CE02MUGE. Apply information systems in the company.
CE12MUGE. Apply management models suitable for edification processes

Generical:
CG1MUGE. Apply the acquired knowledge in solving complex problems in any sector of the building management.
CG2MUGE. Manage projects in the field of construction.

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.

Basic:
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.

TEACHING METHODOLOGY

Master class.
Expository/participative class.
Practices.

LEARNING OBJECTIVES OF THE SUBJECT

- Modelling of the reality by SIG.
- Know the SIG analysis tools.
- Know the principles of the BIM methodology.
- Understand the BIM processes and the benefits derived from the use of the BIM management.
- Acquire the ability to apply BIM in all the life cycle of the building.

STUDY LOAD

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

Total learning time: 125 h

CONTENTS

Topic 1: Building management through BIM systems

Description:
- The work with objects.
- BIM work structure.
Hierarchy, types and families.
- Data management and file transfer.

Specific objectives:
Know the principles of the BIM methodology.
Understand the BIM processes and the benefits derivated from the use of the BIM management.
Acquire the ability to apply BIM to all the cycle of life of the building.
Be able to design a business model through BIM.

Related activities:
Activities 1 and 2.

Full-or-part-time: 33h 30m
Theory classes: 3h 30m
Guided activities: 5h
Self study : 25h

Topic 2: Fundamentals of GIS

Description:
Introduction to SIG.

Specific objectives:
Topic of introduction to GIS. Past, present and future of the SIG.

Related activities:
Activity 3

Full-or-part-time: 4h
Theory classes: 2h
Self study : 2h

Topic 3: Data

Description:
- Data sources.
- Types: raster, vector.
- Quality.
- Metadata.

Specific objectives:
Know the different spatial data sources and its treatment inside a SIG.
Know and apply the quality control paramenters of the spatial data and creation of metadata.

Related activities:
Activity 4

Full-or-part-time: 8h
Theory classes: 1h
Guided activities: 1h
Self study : 6h

Topic 4: Analysis

Description:
- Types of spatial analysis in a SIG.
- Spatial relations. Topology.
- Questions and operations with data bases.
- Basic analytical operations in a vector SIG.
- Applications.

Specific objectives:
- Know and apply the basic tools of enquiry and analysis of a SIG for vector data.

Related activities:
Activity 5

Full-or-part-time: 32h 30m
Theory classes: 1h 30m
Laboratory classes: 1h
Self study : 30h

ACTIVITIES

Activity 3. ArcGIS platform

Description:
Work with the software ArcGIS with municipal cartography.

Specific objectives:
Work with open data of urban management.

Full-or-part-time: 1h
Practical classes: 1h

Activity 4. Data management

Description:
Introduction and management of graphical and alphanumeric data of different sources.

Delivery:
Report of the practice.

Full-or-part-time: 5h
Practical classes: 2h
Self study: 3h

Activity 5. Vector analysis

Description:
Learning of the tools for vector analysis.

Delivery:
Report of the practice.

Full-or-part-time: 9h
Laboratory classes: 1h
Guided activities: 4h
Self study: 4h

Activity 1

Description:
Numerical, metric and positional control of objects in BIM.

Delivery:
Analysis of a building and data management. Report of the work.

Related competencies :
CE12MUGE. Apply management models suitable for edification processes

Full-or-part-time: 14h
Theory classes: 1h
Laboratory classes: 3h
Self study: 10h

Activity 2

Description:
Volumetric modelling of data management.

Delivery:
Report of the work.

Related competencies :
CG1MUGE. Apply the acquired knowledge in solving complex problems in any sector of the building management.

Full-or-part-time: 12h
Practical classes: 2h
Self study: 10h

GRADING SYSTEM

The student will be evaluated by the fulfilment of the individual deliverable practices. The weighting will be 50% for GIS practices and 50% for BIM practices.

BIBLIOGRAPHY

Basic:
- BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers and Contractors. 2nd ed. Hoboken (New Jersey): Wiley,, 2011. ISBN 9780470541371.
- Bosque Sendra, Joaquín. Sistemas de información geográfica. 2a ed. Madrid: Rialp, 1997. ISBN 8432131547.
- Moreno, Antonio. Sistemas y análisis de la información geográfica : manual de autoaprendizaje con ArcGIS. 2a ed. Madrid: RA-MA, 2007. ISBN 9788478978380.