# Course guide
# 310426 - 310426 - Advanced 3D Modelling for Construction Processes

**Last modified:** 22/01/2024

**Unit in charge:** Barcelona School of Building Construction
**Teaching unit:** 752 - RA - Departamento de Representación Arquitectónica.

**Degree:** MASTER'S DEGREE IN ADVANCED BUILDING CONSTRUCTION (Syllabus 2014). (Optional subject).

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

## LECTURER

**Coordinating lecturer:** Gustavo de Gispert Irigoyen

**Others:** Gustavo de Gispert Irigoyen

## PRIOR SKILLS

Basic knowledge of construction processes and use of BIM tools

## REQUIREMENTS

To have a computer that allows the use of conventional 3D programs

## DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

**Specific:**
CE1. Capacity of innovation: identify the reasons and the mechanisms of the technologic and technical changes.

**Generical:**
CG3. Prepare the student in the using of tools that are common in the investigation activities, like the analysis and treatment of data, just like methodology and investigation techiniques.

**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.
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

Practical subject for the representation and interpretation of construction processes through the BIM methodology and its visualization through virtual reality techniques.

## LEARNING OBJECTIVES OF THE SUBJECT

-Fluently use Revit as a BIM tool and Twinmotion as a VR tool.
-To introduce 3D representation technologies of constructive processes, of which it will be necessary to know the elements of which it is composed and to virtually develop the process of its execution.

## STUDY LOAD

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

**Total learning time:** 125 h

## CONTENTS

### Construction models in BIM

**Description:**
- Tools will be explained that allow us to generate 3D construction models and the production of 2D plans. We will introduce the BIM methodology by carrying out multi-level projects, the creation of families, creation of urban environments and basic rendering.
- Point cloud and photogrammetry techniques will be used to see their application in BIM.
- BIM management programs will be used to analyze the construction models in the different project control phases

**Specific objectives:**
- Improve skills in the field of constructive 3D modeling.
- Expand the knowledge of BIM programs such as Revit and know the current trend.
- Make fast and efficient renders of the projects, for their exhibition.

**Related activities:**
Construction model

**Full-or-part-time:** 98h
Practical classes: 35h 20m
Self study : 62h 40m

### Interactive VR

**Description:**
We will link the models made with BIM tools, photogrammetry and other external objects to the Twinmotion VR work environment.

**Specific objectives:**
-Widening the spatial vision, managing to capture a constructive model on reality, through virtual reality techniques.
-Strengthen the capacities of expression in public, supported by the use of technological tools

**Related activities:**
VR model

**Full-or-part-time:** 27h
Practical classes: 9h 45m
Self study : 17h 15m

## GRADING SYSTEM

The evaluation will consist of monitoring the weekly activity as a continuous evaluation and the delivery of results in scheduled activities.

## BIBLIOGRAPHY

**Basic:**
- Coloma, E. Tecnologia BIM per al disseny arquitectònic/Director: Joaquim Regot Marimón [on line]. Barcelona: Universitat Politècnica de Catalunya. Escola Tècnica Superior d'Arquitectura de Barcelona. Departament de Expressió Gràfica Arquitectònica I, 2011 [Consultation: 02/07/2020]. Available on: https://upcommons.upc.edu/bitstream/handle/2117/95790/TECP1de1.pdf.
- Hardin, B., McCool, D.. BIM and Construction Management: Proven Tools, Methods, and Workflows, 2nd Edition. John Wiley & Sons Inc, 2015. ISBN 9781118942772.
- Deutsch, R.. BIM and integrated design: strategies for architectural practice. Boston: The American Institute of Architects, 2011. ISBN 9780470572511.
- Kensek, K.. Building information modeling: BIM in current and future practice.. Indianapolis, 2014. ISBN 978-1118766309.
- Porras, H., Sánchez, O., Galvis, J.. "Metodología para la elaboración de modelos del proceso constructivo 5d con tecnologías "building information modeling"". Revista GIT [on line]. [Consultation: 02/07/2020]. Available on: https://dialnet.unirioja.es/servlet/articulo?codigo=5161780.

## RESOURCES

**Other resources:**
http://help.autodesk.com/view/RVT/2019/ESP/?guid=GUID-6678A0E6-2D5D-4349-AFD8-D39C102253DF />http://help.autodesk.com/view/RVT/2019/ESP/?guid=GUID-C7424E33-F884-4EDD-BF42-71585281007F />https://www.autodesk.com/education/free-software/revit />https://www.autodesk.com/education/free-software/3ds-max