

# Course guide

## 310020 - 310020 - Graphic Expression III

Last modified: 06/06/2024

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

**Degree:** BACHELOR'S DEGREE IN ARCHITECTURAL TECHNOLOGY AND BUILDING CONSTRUCTION (Syllabus 2015).  
(Compulsory subject).

**Academic year:** 2024    **ECTS Credits:** 6.0    **Languages:** Catalan, Spanish, English

### LECTURER

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**Coordinating lecturer:** GUSTAVO DE GISPert IRIGOYEN

**Others:** JANINA PUIG COSTA

### DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

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**Specific:**

- FE-2 Knowledge of the infographic and cartographic procedures and methods in the construction field.
- FE-21 Aptitude to analyse, design and execute solutions which facilitate the universal accessibility to the buildings and their environment.

**Transversal:**

- EFFECTIVE USE OF INFORMATION RESOURCES - Level 2. Designing and executing a good strategy for advanced searches using specialized information resources, once the various parts of an academic document have been identified and bibliographical references provided. Choosing suitable information based on its relevance and quality.
- SELF-DIRECTED LEARNING - Level 2: Completing set tasks based on the guidelines set by lecturers. Devoting the time needed to complete each task, including personal contributions and expanding on the recommended information sources.

### TEACHING METHODOLOGY

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It will be published a theoretical issue in Athena Campus to be resolved as an activity by groups of two students during class. 11 activities that must be delivered at the end of each class. The teacher will give guidelines for the conduct of the assignment and guide the student in achieving the goals. Activities will have two sections, common for all students performed in class, and an individual one that will differentiate them as independent learning using the resources supplied. The last topic will be totally personal.

### LEARNING OBJECTIVES OF THE SUBJECT

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After completing the course, students should be able to:

- Identify in a virtual model their physical characteristics in relation to their possible "real" existence.
- Use computer graphics tools to represent and manipulate images and virtual architectural models.

### STUDY LOAD

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Type	Hours	Percentage
Hours large group	30,0	20.00
Hours small group	15,0	10.00
Self study	90,0	60.00
Hours medium group	15,0	10.00



Total learning time: 150 h

## CONTENTS

### C1: 3D MODELS

**Description:**

In this content we work the creation and manipulation of three-dimensional models in different ways. Simple elements, primitives, editing and processing, boolean operations, generation of solids and mesh manipulation.

**Specific objectives:**

Moving easily through programs.  
Create a model with primitives.  
Create models extruding sections.  
Create models rotating sections.  
Manipulate models for the obtaining of new models ny means of Boolean operations.  
Create and manipulate nets and deformation of objects.  
Create a virtual itinerary controled near its model.

**Related activities:**

1-6 Assignments

**Full-or-part-time:** 78h

Practical classes: 24h

Guided activities: 12h

Self study : 42h

### C2: REAL MODEL

**Description:**

Make our model closer to reality, acquiring photorealistic textures and lighting it appropriately to simulate the necessary environment to make it less virtual.

**Specific objectives:**

Manipulating a digital image and define and apply virtual materials to their models.  
Creating lights to give more reality to models.

**Related activities:**

7-8 Assignments

**Full-or-part-time:** 24h

Practical classes: 8h

Guided activities: 4h

Self study : 12h



### C3: ENVIRONMENTS

**Description:**

Expand the possibilities of our models inserting them into larger environments such as, manipulated topographic areas, urban environments, etc.

**Specific objectives:**

Trying to obtain the DTM survey data.

Get Images of projects in their environment before they are built.

Make a simple photographic restitution and apply it.

**Related activities:**

9-11 Assignments

**Full-or-part-time:** 36h

Practical classes: 12h

Guided activities: 6h

Self study : 18h

### C4: MY MODEL

**Description:**

Given some common conditions students will present a free project that uses all the elements worked during the course.

**Specific objectives:**

All of the above activities and to learn to combine all resources consistently.

**Related activities:**

12 assignment

**Full-or-part-time:** 12h

Practical classes: 2h

Self study : 10h



## ACTIVITIES

### A1 INTRODUCTION TO PROGRAMS AND FISRT MODEL.

**Description:**

First introductory assignment to install, if necessary, programs, tour of the most common commands, screens and way of working. It will be done the first guided model and a personal one, only using primitives.

**Specific objectives:**

After the activity, the student should be able to:

Get around swiftly through programs.

Create a model based on primitives.

**Material:**

Guided work and support webs.

**Delivery:**

The personal model will be delivered to the right place. Not puntuable but enters into the requirement in delivering 3 of 5 no puntuable assignment for passing.

**Full-or-part-time:** 13h

Self study: 7h

Practical classes: 4h

Guided activities: 2h

### A2 EXTRUSION.

**Description:**

Extrusion as a model generator. From 2D sections we'll produce more complex three-dimensional models. There will be a guided model and a personal one.

**Specific objectives:**

After the activity, the student should be able to:

Create models using extruded sections.

**Material:**

Guided work and support webs.

**Delivery:**

The personal model will be delivered to the right place. Not puntuable but enters into the requirement in delivering 3 of 5 no puntuable assignment for passing.

**Full-or-part-time:** 13h

Self study: 7h

Practical classes: 4h

Guided activities: 2h



### A3 REVOLUTION.

**Description:**

Revolution as a model generator. From 2D sections we'll produce more complex three-dimensional models around different axes. There will be a guided model and a personal one, not only containing the main topic of this activity, but a summary of all done so far.

**Specific objectives:**

After the activity, the student should be able to:  
Create models using extruded sections.

**Material:**

Guided work and support webs.

**Delivery:**

The personal model will be delivered to the right place. Assessable work worth 10% of the final grade.

**Full-or-part-time:** 13h

Self study: 7h

Practical classes: 4h

Guided activities: 2h

### A4 ADVANCED MODELING. BOOLEANS.

**Description:**

With the combination of several simple shapes we'll obtain advanced results of modeling using boolean operations.. There will be a guided model and a personal one.

**Specific objectives:**

After the activity, the student should be able to:  
Manipulate models to obtain others through boolean operations.

**Material:**

Guided work and support webs.

**Delivery:**

The personal model will be delivered to the right place. Not puntuable but enters into the requirement in delivering 3 of 5 no puntuable assignment for passing.

**Full-or-part-time:** 13h

Self study: 7h

Practical classes: 4h

Guided activities: 2h



## A5 MODIFIERS AND MESHES.

### Description:

Once we have the base models with the techniques already used, we can manipulate them with conversions to meshes and with deformations. There will be a guided model and a personal one.

### Specific objectives:

After the activity, the student should be able to:  
Create and manipulate meshes and deform objects.

### Material:

Guided work and support webs.

### Delivery:

The personal model will be delivered to the right place. Not puntuable but enters into the requirement in delivering 3 of 5 no puntuable assignment for passing.

### Full-or-part-time: 13h

Self study: 7h

Practical classes: 4h

Guided activities: 2h

## A6 CAMERAS AND ANIMATION.

### Description:

We'll create cameras in our scenes and animate them for creating virtual tours. There will be a guided model and a personal one, not only containing the main topic of this activity, but a summary of all done so far.

### Specific objectives:

After the activity, the student should be able to:  
Create a controlled virtual tour around a model.

### Material:

Guided work and support webs.

### Delivery:

The personal model will be delivered to the right place. Assessable work worth 10% of the final grade.

### Full-or-part-time: 13h

Self study: 7h

Practical classes: 4h

Guided activities: 2h



## A7 MATERIALS AND RENDER.

### Description:

With the manipulation of images and other libraries create usable textures to decorate our models realistically imitating physical properties. There will be a guided model and a personal one.

### Specific objectives:

After the activity, the student should be able to:  
Define virtual materials and apply them to models.

### Material:

Guided work and support webs.

### Delivery:

The personal model will be delivered to the right place. Assessable work worth 12,5% of the final grade.

### Full-or-part-time: 12h

Self study: 6h

Practical classes: 4h

Guided activities: 2h

## A8 LIGHTING

### Description:

To improve our virtual scenes we need to incorporate light. We will learn about different types of lighting we can provide. There will be a guided model and a personal one.

### Specific objectives:

After the activity, the student should be able to:  
Create the necessary lighting in order to get more reality to models.

### Material:

Guided work and support webs.

### Delivery:

The personal model will be delivered to the right place. Assessable work worth 12,5% of the final grade.

### Full-or-part-time: 12h

Self study: 6h

Practical classes: 4h

Guided activities: 2h



### A9 DIGITAL TERRAIN MODEL.

**Description:**

Obtain three-dimensional models of land to settle our models, from topographic coordinates obtained from a database. Students will use the data to obtain a common digital terrain model, and manipulate it to suit its personal architectural model.

**Specific objectives:**

After the activity, the student should be able to:  
Autonomous learning.  
Manage topographic data to get the DTM.

**Material:**

Guided work and support webs.

**Delivery:**

The personal model will be delivered to the right place. Assessable work worth 12,5% of the final grade.

**Full-or-part-time:** 12h

Self study: 6h  
Practical classes: 4h  
Guided activities: 2h

### A10 COMBINATION OF REALITY AND FICTION.

**Description:**

Combination of images taken from real environments with virtual models, adapting views, scale, etc. There will a guided model.

**Specific objectives:**

After the activity, the student should be able to:  
Obtain images of projects in their environment before they are built.

**Material:**

Guided work and support webs.

**Delivery:**

The personal model will be delivered to the right place. Assessable work worth 12,5% of the final grade.

**Full-or-part-time:** 12h

Self study: 6h  
Practical classes: 4h  
Guided activities: 2h





### A11 PHOTOGRAPHIC RECTIFICATION.

**Description:**

Using a program of rectification and field data, manipulate photographic images for getting its flat representation to be able to use them as envelopes of our models. We'll use with architectural facades. There will a guided and personal model.

**Specific objectives:**

After the activity, the student should be able to:  
Make a simple photo rectification and apply it.

**Material:**

Guided work and support webs.

**Delivery:**

The personal model will be delivered to the right place. Assessable work worth 12,5% of the final grade.

**Full-or-part-time:** 12h

Practical classes: 4h

Guided activities: 2h

Self study: 6h

### A12 FINAL ASSIGNMENT.

**Description:**

With all the knowledge gained, perform a complete model according to the specifications given in the supporting material.

**Specific objectives:**

After the activity, the student should be able to:  
All of the preceding activities and combining of all knowledge and resources consistently.

**Material:**

Previous assignments.

**Delivery:**

The personal model will be delivered to the right place. Assessable work worth 30% of the final grade.

**Full-or-part-time:** 12h

Self study: 12h

## GRADING SYSTEM

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Student evaluation will be continued.

Six of the personal assignments will score 70% of the final grade, the other 30% will come out from final project. In the period of re-evaluation, the delivery of late work will be allowed if the qualification obtained is 3.5.

### Evaluation Schedule

Delivery Activity 01: Week 1  
Delivery Activity 02: Week 2  
Delivery Activity 03: Week 3  
Delivery Activity 04: Week 4  
Delivery Activity 05: Week 5  
Delivery Activity 06: Week 6  
Delivery Activity 07: Week 8  
Delivery Activity 08: Week 9  
Delivery Activity 09: Week 10  
Delivery Activity 10: Week 11  
Delivery Activity 11: Week 12  
Delivery Activity 12: Week 15

## EXAMINATION RULES.

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- It is necessary to pass the course deliver 3 of the 5 non-scoring assignments.
- It is a necessary condition to pass the course deliver 5 of the first 6 scoring assignments.
- It is necessary to pass the course deliver the last project.
- If deadlines are not attended, the assignments will be considered as not delivered.

## BIBLIOGRAPHY

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### Basic:

- Ashford, J. Diseño gráfico en 3D. Madrid: Anaya, 2009.
- Sáinz Avia, Jorge ; Valderrama, Fernando. Infografía y arquitectura: dibujo y proyecto asistidos por ordenador. Barcelona: Ed. Nerea, 1992. ISBN 8486763681.
- Tajadura Zapirain, José Antonio. AutoCAD avanzado 2013-2014. Madrid [etc.]: McGraw-Hill, 2013. ISBN 9788448175344.
- Birn, Jeremy. Técnicas de iluminación y render. 1ª. Madrid: Anaya Multimedia, 2001. ISBN 9788441510944.
- Mediaactive. El Gran libro de 3ds max 2013. [Barcelona]: Marcombo, 2013. ISBN 9788426719928.
- Fullaondo Buigas de Dalmau, María; González Fernández de Valderrama, Fernando; Rodríguez de Partearroyo, Francisco; Sáinz Avia, Jorge. Curso de 3DS Max para arquitectos : modelado, materiales e iluminación. Barcelona: Reverté, cop. 2011. ISBN 9788429121209.

### Complementary:

- Ratner, Peter. Animación 3D. 1ª. Madrid: Anaya Multimedia, 2005. ISBN 9788441518094.