310020 - Graphic Expression III

Coordinating unit: 310 - EPSEB - Barcelona School of Building Construction
Teaching unit: 752 - RA - Departamento de Representación Arquitectónica
Academic year: 2018
Degree: BACHELOR'S DEGREE IN ARCHITECTURAL TECHNOLOGY AND BUILDING CONSTRUCTION (Syllabus 2015). (Teaching unit Compulsory)
BACHELOR'S DEGREE IN BUILDING CONSTRUCTION SCIENCE AND TECHNOLOGY (Syllabus 2009). (Teaching unit Compulsory)
ECTS credits: 6
Teaching languages: Catalan, Spanish, English

Teaching staff
Coordinator: GUSTAVO DE GISPERT IRIGOYEN
Others: JANINA PUIG COSTA

Degree competences to which the subject contributes

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

Transversal:
4. 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.
3. 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

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

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.
## 310020 - Graphic Expression III

### Study load

<table>
<thead>
<tr>
<th></th>
<th>Hours large group:</th>
<th>Hours medium group:</th>
<th>Hours small group:</th>
<th>Guided activities:</th>
<th>Self study:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total learning time:</strong></td>
<td>150h</td>
<td>30h</td>
<td>15h</td>
<td>15h</td>
<td>90h</td>
</tr>
<tr>
<td></td>
<td>20.00%</td>
<td>10.00%</td>
<td>10.00%</td>
<td>0.00%</td>
<td>60.00%</td>
</tr>
</tbody>
</table>
310020 - Graphic Expression III

## Content

### C1: 3D MODELS

**Learning time:** 78h  
- Practical classes: 24h  
- Guided activities: 12h  
- Self study: 42h

**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.

**Related activities:**  
1-6 Assignments

**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 by means of Boolean operations.  
- Create and manipulate nets and deformation of objects.  
- Create a virtual itinerary controlled near its model.

### C2: REAL MODEL

**Learning time:** 24h  
- Practical classes: 8h  
- Guided activities: 4h  
- Self study: 12h

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

**Related activities:**  
7-8 Assignments

**Specific objectives:**  
- Manipulating a digital image and define and apply virtual materials to their models.  
- Creating lights to give more reality to models.
### C3: ENVIRONMENTS

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

**Related activities:**
- 9-11 Assignments

**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.

**Learning 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.

**Related activities:**
- 12 assignment

**Specific objectives:**
- All of the above activities and to learn to combine all resources consistently.

**Learning time:** 12h
- Practical classes: 2h
- Self study: 10h
### Planning of activities

| A1 INTRODUCTION TO PROGRAMS AND FIRST MODEL. | Hours: 13h  
Practical classes: 4h  
Guided activities: 2h  
Self study: 7h |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Support materials:</strong></td>
<td>Guided work and support webs.</td>
</tr>
<tr>
<td><strong>Descriptions of the assignments due and their relation to the assessment:</strong></td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td></td>
</tr>
<tr>
<td><strong>Specific objectives:</strong></td>
<td>After the activity, the student should be able to: Get around swiftly through programs. Create a model based on primitives.</td>
</tr>
</tbody>
</table>

| A2 EXTRUSION.  | Hours: 13h  
Practical classes: 4h  
Guided activities: 2h  
Self study: 7h |
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Support materials:</strong></td>
<td>Guided work and support webs.</td>
</tr>
<tr>
<td><strong>Descriptions of the assignments due and their relation to the assessment:</strong></td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td></td>
</tr>
<tr>
<td><strong>Specific objectives:</strong></td>
<td>After the activity, the student should be able to: Create models using extruded sections.</td>
</tr>
</tbody>
</table>

| A3 REVOLUTION.  | Hours: 13h  
Practical classes: 4h  
Guided activities: 2h  
Self study: 7h |
|----------------|--------------------------------------------------|
### 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.

### Support materials:
Guided work and support webs.

### Descriptions of the assignments due and their relation to the assessment:
The personal model will be delivered to the right place. Assessable work worth 10% of the final grade.

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

---

### A4 ADVANCED MODELING. BOOLEANS.

<table>
<thead>
<tr>
<th><strong>Hours</strong></th>
<th><strong>Practical classes:</strong></th>
<th><strong>Guided activities:</strong></th>
<th><strong>Self study:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>13h</td>
<td>4h</td>
<td>2h</td>
<td>7h</td>
</tr>
</tbody>
</table>

### 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.

### Support materials:
Guided work and support webs.

### Descriptions of the assignments due and their relation to the assessment:
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.

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

---

### A5 MODIFIERS AND MESHES.

<table>
<thead>
<tr>
<th><strong>Hours</strong></th>
<th><strong>Practical classes:</strong></th>
<th><strong>Guided activities:</strong></th>
<th><strong>Self study:</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>13h</td>
<td>4h</td>
<td>2h</td>
<td>7h</td>
</tr>
</tbody>
</table>

### 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.

### Support materials:
Guided work and support webs.
### 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.

**Support materials:**
Guided work and support webs.

**Descriptions of the assignments due and their relation to the assessment:**
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.

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

**Hours:**
- Practical classes: 4h
- Guided activities: 2h
- Self study: 7h

### 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.

**Support materials:**
Guided work and support webs.

**Descriptions of the assignments due and their relation to the assessment:**
The personal model will be delivered to the right place. Assessable work worth 12,5% of the final grade.

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

**Hours:**
- Practical classes: 4h
- Guided activities: 2h
- Self study: 6h
### A8 LIGHTING

**Hours:** 12h
- Practical classes: 4h
- Guided activities: 2h
- Self study: 6h

**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.

**Support materials:**
- Guided work and support webs.

**Descriptions of the assignments due and their relation to the assessment:**
The personal model will be delivered to the right place. Assessable work worth 12.5% of the final grade.

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

### A9 DIGITAL TERRAIN MODEL.

**Hours:** 12h
- Practical classes: 4h
- Guided activities: 2h
- Self study: 6h

**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.

**Support materials:**
- Guided work and support webs.

**Descriptions of the assignments due and their relation to the assessment:**
The personal model will be delivered to the right place. Assessable work worth 12.5% of the final grade.

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

### A10 COMBINATION OF REALITY AND FICTION.

**Hours:** 12h
- Practical classes: 4h
- Guided activities: 2h
- Self study: 6h

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

**Support materials:**
Guided work and support webs.

**Descriptions of the assignments due and their relation to the assessment:**
The personal model will be delivered to the right place. Assessable work worth 12,5% of the final grade.

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

**Hours:**
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.

**Support materials:**
Previous assignments.

**Descriptions of the assignments due and their relation to the assessment:**
The personal model will be delivered to the right place. Assessable work worth 30% of the final grade.

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

**Hours:**
12h
- Self study: 12h
Qualification system

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

Regulations for carrying out activities

- 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

Basic:


Complementary: