# Graphic Expression II – Computer Design

<table>
<thead>
<tr>
<th>Module</th>
<th>Subject</th>
<th>Year</th>
<th>Semester</th>
<th>ECTS</th>
<th>Type</th>
</tr>
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<tbody>
<tr>
<td>Graphic Expression</td>
<td>Computer Design</td>
<td>1°</td>
<td>2°</td>
<td>6</td>
<td>Basic</td>
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</table>

## Degree
Degree in Building Engineering

### Department
Department of Graphic Expression in Architecture and Engineering

### Professors and Timetable of Tutorship

**Moreno Cazorla, Ricardo.** Third floor. Room 4. rmc@ugr.es
- Tuesday from 12:30 to 14:30.
- Wednesday from 12:30 to 14:30.
- Thursday from 12:30 to 14:30.

**Arco Díaz, Julián.** First floor. Room 19. juliannn@ugr.es
- Monday from 12:30 to 13:30. (1st Semester).
- Tuesday from 9:30 to 13:30. (1st Semester).
- Wednesday from 12:30 to 13:30. (1st Semester).
- Monday from 12:30 to 13:30. (2nd Semester).
- Tuesday from 12:30 to 13:30. (2nd Semester).
- Wednesday from 12:30 to 13:30. (2nd Semester).
- Friday from 10:30 to 13:30. (2nd Semester).

**Cruz Valdivieso, Ana María.** First floor. Room 20. anacru@ugr.es
- Monday from 10:30 to 13:30.
- Wednesday from 10:30 to 13:30.

**Hidalgo García, David.** Third floor. Room 1. dhidalgo@ugr.es
- Monday from 11:00 to 13:30. (1st Semester).
- Wednesday from 11:00 to 13:30. (1st Semester).
- Friday from 11:00 to 12:00. (1st Semester).
- Monday from 10:00 to 13:00. (2nd Semester).
- Tuesday from 10:00 to 13:00. (2nd Semester).

**García Escrivano, Roberto.** Third floor. Room 2. rogaes@ugr.es
- Monday from 10:30 to 13:30. (1st Semester).
- Tuesday from 19:30 to 21:30. (1st Semester).
- Monday from 12:30 to 14:30. (2nd Semester).
- Tuesday from 19:30 to 21:30. (2nd Semester).

**Ramos Viciana, Fernando José.** Third floor. Room 2. ramosviciana@gmail.com
- Tuesday from 12:30 to 14:30.
- Thursday from 11:30 to 14:30.
- Friday from 11:30 to 12:30.

**Rodríguez Ruiz, Francisco de Asís.** Third floor. Room 2. asis_cad@gmail.com
- Monday from 10:30 to 13:30.
- Friday from 19:30 to 21:30 hours.
### PREREQUISITES AND/OR RECOMMENDATION

Have studied subjects “Graphic Expression I: Direct procedures” and “Descriptive Geometry”. Have adequate knowledge about:
- Basic computer science.
- Digital photography.

### SHORT DESCRIPTION OF CONTENTS

Systems of representation. Advanced procedures in graphic expression.

Description, documentation and communication of the building processes. Resources and computer techniques in the graphic expression of buildings, methods and application.

### GENERAL AND SPECIFIC COMPETENCES

Knowledge of resources and more advanced computer techniques in the graphic expression of buildings. Capability to apply them, through procedures and corresponding methods, in description, documentation and communication of the building processes.

### OBJECTIVES (EXPRESSED AS EXPECTED RESULTS OF THE EDUCATION)

#### BASIC CADD.

Know the basic differences between CADD systems, market leaders and their applications for each sector and purpose.

Apply basic drawing tools in different CADD systems and exchange data between them.

#### CADD 2D.

Create orthogonal multiview projections and sections of the building or of the parts and elements which compose it.

Know and apply the application rules for CAD in architecture, engineering and construction.

Know description, documentation and graphic communication necessary to complete the definition of a project, an existing building or a planned constructive solution.

Adjust correctly the level of details, scale and standardized thickness, adequate in each case for the pursued aim.

Apply infographic procedures necessary to express different elements and parts that compose the building, using appropriate visual attributes: line, color, annotation, etc.

#### CADD 3D.

Create model or virtual mock-up which represents a building or an element through the modeling and accumulation of fundamental parts that compose it, using adequate procedures in each case.

Obtain from the model views and orthogonal multiview projections, perspectives and axonometric projections of any type.

Obtain photorealistic images from the model using any of the systems of representation. Use and make up photographic images with technical drawing.
### DETAILED LIST OF THE SUBJECT’S TOPICS

#### THEORY TOPICS:


**Topic 3.** Drawing 2D and annotation workspace. Creating and modifying objects. Drawing annotation. Drawing up and publication of drawings.

**Topic 4.** Transition of traditional drawing procedures to CADD 2D. Orthographic multiview projections of building. Standardization in CADD. Level of details and standardized scales.


**Topic 7.** Advanced workspace. Operating with files. Creating and modifying objects.


#### Exercises:

**Unit 1:**
- Structural shapes, doors and windows.
- Geometric line tracing.
- Triangulation of the building plot.

**Unit 2:**
- 45º shading defined by user on the non-orthogonal outline.
- Measurements of area and perimeter.
- Joining walls solutions.
- Adjusting the level of details, line thickness and scale.
- Annotation, shading and scale.
- Configuration of blocks and layers.

**Unit 3:**
- 3D modeling of simple pieces.
- Boolean operations.
- Orthographic views of simple pieces.
- Camera views.
- Sections of pieces.
- Projections of pieces.

**Unit 4:**
- Scene modeling with simple materials and light.
- Comparison between graphic computer applications: AutoCAD, 3dsmax, Cinema4D, Vray, Maxwell Render, Kerkythea, Blender. (in class)

**Unit 5:**
- Straight stairs, arched stairs and mixed stairs.
- Modification of complex pieces.
- Drawing, annotation and 3D modeling of constructive sections.
- Traditional axonometric projections.
- Cavalier projections of one piece.
- Cabinet projections of one piece.

**Unit 6:**
- 3D modeling by dimensioned plans and by decomposition.
- Drawing, layout and 3D modeling of the roof.
- Molding in cornices.
  Unite 7:
- Comparison between applications CAD BIM: Revit, ArchiCAD, Allplan. (in class)
- Furnishings and carpentry of Final Project (in groups)

PRACTICAL TOPICS: Laboratory practices:

Practice 1. Installing educational programs or trial versions. Installation report.

BIBLIOGRAPHY:

BASIC BIBLIOGRAPHY:
- Dibujo Técnico / F.J. Rodríguez de Abajo, F. Álvarez Bengoa - San Sebastián: Ed. Donostiarra, 1990

ADDITIONAL BIBLIOGRAPHY:
- UNE 136020 - Tejas Cerámicas. Código de Práctica para el diseño y el montaje de cubiertas con tejas cerámicas.
- NTE QTT - Tejados Cerámicas. Código de Práctica para el diseño y el montaje de cubiertas con tejas cerámicas.
- Manual para el Diseño y Ejecución de Cubiertas de Teja Cerámica, editado por Hispalyt.

ONLINE RESOURCES

Descriptive Geometry and Technical Drawing:
- www.dibujotecnico.com
- www.educacionplastica.net
- www.tododibujo.com
- www.trazoide.com

Computer Aided Design:
- http://www.autodesk.es
- http://estudiantes.autodesk.es

ACADEMIC YEAR 2012-13

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Teaching guide

GRAPHIC EXPRESSION II – COMPUTER DESIGN

http://seek.autodesk.com
Identify Access (Acceso Identificado) to University of Granada website:
https://oficinavirtual.ugr.es/csirc/nuevoacceso/pagina1.htm

TEACHING METHODOLOGY

1º) Theory lessons: Systematically arranged contents are presented from a general perspective. Lessons are of obligatory attendance, because it is when students are being provoked to reflect, remember, make questions, criticize and actively participate in their own development, starting a conversation which would allow gaining trust in completing a task that is carrying out. It is recommended that students take their own notes and annotations which consider appropriates (explanations, examples, clarifications, etc.) that together with notes provided by teacher will complete the teaching material.

2º) Lessons with solving exercises and/or problems: Mainly these are going to be lessons during which students are going to present individually the solution to the problems and exercises they were previously asked to do; seminars in which students working in small groups guided by the teacher will study and present to the others problems and practices applied to Building Engineering. This way the atmosphere of dialogue, discussion and critical debate is brought about in which participate both: students who presents and those who pay attention. Inside this group of activities we can distinguish among others the following ones:

3º) Practical lessons with use of updated computer applications: Students work in groups guided by teacher and computer aided, they apply their theory and practical knowledge to solve application problems. This will develop student’s autonomous learning skills, bringing about independent and critical studying and from the other side there will also be proposed other group works which will develop transverse capabilities.

4º) Autonomous learning: Involves individual studying of contents of different topics, previously explained on the theory and practical lessons.

5º) Individual work: Application of contents of different topics to solve problems and analyze theory-practical questions, tasks corresponding to laboratory practices and carrying out possible research works. From the other side there will also be practices and projects proposed to elaborate during workshops, when students will be able to develop and relate different contents learned at theory and practical lessons.

6º) Tutorship: To guide students individually or in small groups, and clarify theory and practical contents to be developed in different task and activities previously described.

7º) Autonomous progress: Involves consulting the bibliography as well as online resources related to each topic, which will be provided by professor at the lectures.

Evaluation. Students will show the knowledge they have gained during the teaching period, by taking a theory and practical exams. It will evaluate the acquisition of theory and practical skills during the learning process. Besides, there will be practical tasks added to the evaluation: exercises, practices, projects and workshops which students are supposed to carry out during the course.

The methodology is guided and determined by a learning platform: Moodle. It is software that allows creation of courses and Web places based on the Internet. The optimum learning atmosphere is the one with a dynamic interaction between instructors, students and activities, which allow them creation of their own truth thanks to the communication with the others. Therefore, this theory emphasizes the importance of culture and context to understand what is happening in the society and to build knowledge based on this understanding. It means that it is worth to establish a fluid
communication on the educational ground to create a learning process between all members of the group. Once you have thought about these topics, it will help to concentrate on the experiences which could have been better to be taught from the students ‘point of view, instead of providing them with information that you think will be necessary for them. It also allows realizing how each apprentice can be not only a student but also a teacher. Your work can change from being a ‘knowledge fountain’ to be the one who influences students as a model to follow, connecting with students in a personal way which will supervise their own need of knowledge, and moderating debates and activities so that it guides students to reach the teaching objectives of the lessons.

Obviously, Moodle does not force this type of behavior but it helps to put it into practice.

EVALUATION

- Evaluation of this subject will have two stages:

1º) Pass exercises carried out during semester and pass an exam based on exercises. This evaluation stage will be decided with notes ‘capable’ or ‘not capable’.

2º) Carrying out the Final Project which will involve the study and graphic description of a building. This project will be valued numerically from 0 to 10 and determine the students’ final note.

PROGRAM OF ACTIVITIES

<table>
<thead>
<tr>
<th></th>
<th>TOPICS</th>
<th>Activities to attend</th>
<th>Individual activities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Theory sessions</td>
<td>Practical sessions</td>
</tr>
<tr>
<td>Week 1</td>
<td>T1, P1</td>
<td>2</td>
<td>2</td>
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<tr>
<td>Week 2</td>
<td>T2, E1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Weeks 3 and 4</td>
<td>T3, T4, E2, P2</td>
<td>2</td>
<td>1</td>
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<tr>
<td>Weeks 5 and 6</td>
<td>T5, E3, P3</td>
<td>2</td>
<td>4,5</td>
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<td>Week 7</td>
<td>T5, T6, E4, P4</td>
<td>1</td>
<td>3,5</td>
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## Teaching guide

**GRAPHIC EXPRESSION II – COMPUTER DESIGN**

<table>
<thead>
<tr>
<th>Week</th>
<th>T6, E5, P5</th>
<th>T7, E6, P6</th>
<th>T8, E7, P7</th>
<th>P7</th>
<th>Total hours</th>
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<tbody>
<tr>
<td>Week 8</td>
<td>1</td>
<td>1,5</td>
<td>0,5</td>
<td>1</td>
<td>2,75</td>
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<tr>
<td>Weeks 9 and 10</td>
<td>2</td>
<td>2,5</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Weeks from 11 to 15</td>
<td>3</td>
<td>5</td>
<td>3,5</td>
<td>2</td>
<td>6</td>
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<td>Weeks from 16 to 19</td>
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<td>Total hours</td>
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<td>7,5</td>
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<td>30</td>
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