Universitat Autònoma de Barcelona

2020/2021

Computer Assisted Design (CAD)

Code: 101749
ECTS Credits: 6

Degree	Type	Year	Semester
2501233 Aeronautical Management	OB	2	2

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

Contact

Name: Angel Rosales Garcia
Email: Angel.Rosales@uab.cat

Use of Languages

Principal working language: catalan (cat)
Some groups entirely in English: No
Some groups entirely in Catalan: Yes
Some groups entirely in Spanish: No

Teachers

Angel Rosales Garcia

Prerequisites

Recommended to have basic concepts of technical drawing and descriptive geometry

Objectives and Contextualisation

The aim of the subject Disseny Gràfic per Ordinador (CAD) is to prepare the students for the interpretation and preparation of graphic documents necessary for the exercise of their professional activity, promoting graphic understanding and expression, by learning an introductory basis to technical drawing, descriptive geometry, plans interpretation and use of AutoCAD software.

The students will learn about the systems and techniques of representation most appropriate to each case, as well as getting a general vision of basic architectural and construction concepts.

Special attention will be paid to the application of manual and computer-assisted representation techniques, with a parallel development of interpretation, definition and spatial representation capabilities.

Competences

- Apply specific software for solving problems in the aeronautical sector.
- Develop software of low or medium complexity.
- Personal attitude.
- Personal work habits.
- Thinking skills.
- Use knowledge of the fundamental principles of mathematics, economics, information technologies and psychology of organisations and work to understand, develop and evaluate the management processes of the different systems in the aeronautical sector.
- Use new technologies in airline management.

- Work in teams.

Learning Outcomes

1. Describe object parts and routing volumetrically.
2. Develop critical thought and reasoning.
3. Develop independent learning strategies.
4. Develop scientific thinking skills.
5. Develop systemic thinking.
6. Develop the ability to analyse, synthesise and plan ahead.
7. Identify, manage and resolve conflicts.
8. Integrate graphic models in digital simulation environments in order to verify and validate volumetries.
9. Interpret graphic documents needed in professional practice.
10. Interpret topographic and urban plans.
11. Maintain a proactive and dynamic attitude towards career progression, personal growth and continuous professional development. Have the will to succeed.
12. Maintain developed models and adapt them to new needs.
13. Make decisions.
14. Make efficient use of the most commonly used representation techniques in the aeronautical sector.
15. Manage time and available resources. Work in an organised manner.
16. Prevent and solve problems.
17. Select and use a suitable graphic design tool for the problem to be tackled.
18. Study and analyse software and machinery resources needed for efficient version control maintenance.
19. Use CAD systems to manage the lifecycle of a product.
20. Use and apply operations and their algebraic interpretation.
21. Use basic knowledge of systems and techniques of graphic representation.
22. Work cooperatively.
23. Work independently.

Content

Theory (TE) and PAUL (Classroom practices):

- The graphic representation
  - History and evolution of the drawing.
  - The drawing as a language.
  - The human scale, the need to measure the environment and the measures in aeronautics.
  - Standardization.
  - European view system.
- The representation systems in technical drawing.
  - Projections
  - Classification of representation systems. The plane, physical means of communication.
  - The scale of representation. Dimensioning, labeling and legends.
- The dihedral system.
  - Fundamentals
  - The point. Definition and representation.
  - The line. Definition and representation.
  - The plan. Definition and representation.
  - The volume. Definition and representation.
  - The plan, the section and the elevation.
- The axonometric system.
  - Fundamentals
  - Reduction coefficients.
  - Orthogonal axonometry (isometric, dimetric, trimetric).
  - Oblique axonometry (cavalry, military).
- The conical system.
  - Fundamentals

Perspective methods.
Front perspective.
Oblique perspective.
Aerial perspective.

- The building project.
  Regulations - legal framework.
  Urban planning and plan director.
  Agents, program and work phases.
  Documents of the building project.
  Programming.
- The elements of the building.
  Envelope
  Support structure
  Internal compartmentation.
  Facilities.
  The exterior of the building.

PLAB (Laboratoy practices):

- Introduction to the foundations of AutoCAD, drawing and construction orders.
- Texts, plots, boundaries and layers.
- Solids in 3D concepts.

Methodology

The proposed teaching methodology may undergo some modifications according to the restrictions imposed by the health authorities on on-campus courses.

Theory sessions (TE) will be taught with the whole group in the classroom.

At the same time, the theoretical concepts will be reinforced through classroom practice sessions (PAUL) and laboratory practices sessions (PLAB).

Classroom practice sessions (PAUL), technical drawing, descriptive geometry and interpretation of plans, will be made individually in the seminar, with the support and supervision of the professor and in different groups (PAUL11/PAUL12).

The laboratory practices sessions (PLAB), with AutoCAD software support, will be carried out in pairs (maximum two people) in the computer lab, with the support and supervision of the professor and in different groups (PLAB11/PLAB12/PLAB13).

During the sessions of PAUL and PLAB, guided practices will be carried out that the students will elaborate progressively as they advance in the sessions, with the aim of acquiring experience to overcome successfully, in order to obtain the final qualification of classroom practices (PAUL) and laboratory practices (PLAB). Some of these practices will be evaluable, counting their score for the qualification of each of the parties.

It will inform about any change of procedure and/or programming for reasons of adaptation to possible incidents in the Virtual Campus of the subject. It is understood that this is the usual platform for exchanging information between professors and students.

Practical classroom sessions material (PAUL):

- Plates format DIN A-3 (420x297mm) without frame (8-10 units).
- Pencil and/or mechanical pencil (0,3mm or 0,5mm), hardness 2B, 2H and H; pencil sharpener and eraser.
- Graduated rule, minimum 40cm; square and bevel, minimum 25cm; protractor.
- Precision compass.

Practical lab sessions material (PLAB):

- It is recommended to install the software AutoCAD (free version for students) in the computer equipment of the students. The professor will explain the first day of class how to obtain it.

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Theory sessions	26	1.04	1, 14, 8, 9, 10, 17, 21, 20
Type: Supervised			
Classroom practices	12	0.48	5, 3, 15, 11, 13, 16, 23
Laboratory practices	14	0.56	3, 9, 11, 17, 23, 19
Type: Autonomous			
Study, practices and preparation of exercices	96	3.84	1, 4, 5, 3, 14, 15, 8, 9, 10, 12, 17, 23, 21, 20, 19

Assessment

The proposed evaluation activities may undergo some changes according to the restrictions imposed by the health authorities on on-campus courses.

a) Scheduled evaluation process and activities.

The global qualification of the subject will be determined according to the following options:

Continuous assessment option:

(obligatory follow-up for first enrollment students).

- 40% grade of COURSE EXAM
- 30% grade of PAUL (15% first scoring practice + 15% second scoring practice)
- 30% grade of PLAB (15% first scoring practice + 15% second scoring practice)

Second enrollment option:

(for students from the second enrollment or as a recovery of the continuous assestment option).

- 60% grade of RECOVERY EXAM
- 20% grade of PAUL (10% first scoring practice + 10% second scoring practice)
- 20% grade of PLAB (10% first scoring practice + 10% second scoring practice)

The assessment of classroom practices (PAUL) and laboratory practices (PLAB) will be at the discretion of the professor, depending on their complexity degree.

Attendance at all sessions is mandatory, as well as the performance and presentation of all PAUL and PLAB practices (both scoring and non-scoring).

The two PAUL scoring tests and the two PLAB scoring tests are inescapable to overcome the continuous assestment option and/or the second enrollment option.

It will be necessary to obtain a minimum score of 4 points (out of 10) in each of the PAUL and PLAB parts to be able to take the COURSE EXAM and/or the RECOVERY EXAM.

It will be necessary to obtain a minimum score of 4 points (out of 10) in each of the COURSE EXAM and/or RECOVERY EXAM to make the weighting of the grade in the global subject, according to the assesstment options specified above.

A final grade of Approved will be obtained in the global of the subject when a minimum score of5 points (out of 10) is reached in the weighting of the resulting grade in the global of the subject, according to the assesstment options specified above.

A final grade of Suspended will be obtained in the global of the subject when the minimum score required in any of the parts is not reached or when the weighting of the resulting grade in the global of the subject is less than 5 points (out of 10).

b) Evaluation activities programming.

The schedule, time and place of the continuous assessment and second enrollment tests will be published in the Virtual Campus of the subject and will be informed during the first sessions.

c) Recovery process.

First-enrollment students may choose the second enrollment option and take the RECOVERY EXAM, after not having passed the continuous assesstment option, provided they have submitted to a set of activities that represent at least two-thirds of the final grade of the subject and have passed or obtained the minimum score required in classroom practices (PAUL) and laboratory practices (PLAB).

Classroom practices (PAUL) and laboratory practices (PLAB) will not have recovery as they must be done in person and continuously during the course.

d) Procedure to review the qualifications.

The procedure for reviewing the qualifications of the continuous assessment and re-evaluation tests will be in person, at the time and place published on the Virtual Campus of the subject, previous communication to the professor, personally or via email.

If the student does not appear in this revision, the pertinent grade will not be reviewed later.

e) Special qualifications.

A grade of Not Evaluable (NA) will be obtained when the students do not attend any of the previously described parts (PAUL, PLAB, COURSE EXAM and/or RECOVERY EXAM).

Granting an Honors Certificate (MH) is the decision of the professor of the subject. Only the studentswhohave obtained a final grade equal or higher than 9 points (out of 10) and up to 5% of the total number of students enrolled may be awarded.

f) Irregularities commited by the students.

The consequences of cheating or committing any irregularity in any of the evaluation activities is reflected in the evaluation regulations in the UAB studies, which specify that:

"Without prejudice to other disciplinary measures considered appropriate, the irregularities committed by the student that can lead to a variation in the rating of an evaluation act will be qualified with a zero. Therefore, copying, plagiarizing, cheating, copying, etc. In any of the assessment activities, it will imply suspending it with a zero. Assessment activities qualified in this way and by this procedure will not be recoverable. If it is necessary to pass any of these assessment activities to pass the subject, this subject will be suspended directly, without an opportunity to recover it in the same academic year. "

The score obtained in case of irregularities by the student will be 0 points (out of 10) in that part of the subject (PAUL, PLAB, COURSE EXAM and/or RECOVERY EXAM).

g) Evaluation of second and subsequent enrollment students.

Students enrolled in second and subsequent enrollments who have not passed any part of the subject of previous calls (PAUL and/or PLAB) must take the continuous assessment option, specified above.

Students enrolled in second and subsequent enrollments who have passed any part of the subject of previous calls (PAUL and/or PLAB), may perform a validation of the qualification of each of the parties by means of a Validation Test for each of them.

The qualification of the corresponding part (PAUL and/or PLAB) will be the one obtained in this test.

To be eligible for this Validation Test, interested students must communicate their interest to the professor, personally or via email, within a maximum of 14 calendar days from the start of the first teaching session.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Classroom practices (PAUL)	30%	0	0	1, 4, 5, 3, 6, 2, 18, 14, 15, 7, 8, 9, 10, 12, 11, 13, 16, 17, 22, 23, 21
Laboratory Practices (PLAB)	30%	0	0	1, 4, 5, 3, 6, 2, 18, 14, 15, 7, 8, 9, 10, 12, 11, 13, 16, 17, 22, 23, 21, 20, 19
Theory exam	40%	2	0.08	1, 4, 5, 6, 2, 14, 15, 7, 9, 10, 12, 13, 17, 23, 21

Bibliography

Descriptive geometry and plan interpretation:

González Moreno-Navarro, J. L., Casals, A., Falcones, A. (1997). *Les Claus per a construir l'arquitectura*. Departament de Política Territorial i Obres Públiques.

Izquierdo Asensi, F. (2004). *Geometria descriptiva*. Editorial Paraninfo.

Izquierdo Asensi, F. (2004). *Geometría descriptiva, tomo II: Líneas y superficies.* Editorial Paraninfo.

Neufert, E., Neufert, E., & Kister, J. (2013). *Arte de proyectar en arquitectura*. Editorial Gustavo Gili.

Rodŕiguez de Abajo, F. J., & Alvarez Bengoa, V. (1992). *Curso de dibujo geometrico y de croquizacion.* Editorial Donostiarra.

Sánchez Gallego, J. A., & Villanueva Bartrina, L. (1991). *Temes clau de dibuix tecnic*. Universitat Politècnica de Catalunya.

AutoCAD software:

Any of the manuals and guides existing in the market published in reference to the software and that includes 2D and 3D teaching may be adequate and sufficient to help the student to support the practices.