Universidad Zaragoza

Academic Year/course: 2022/23

29703 - Graphic expression and computer aided design

Syllabus Information

Academic Year: 2022/23
Subject: 29703 - Graphic expression and computer aided design
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 434 - Bachelor's Degree in Mechanical Engineering
ECTS: 6.0
Year: 1
Semester: 434-First semester o Second semester
107-First semester
Subject Type: Basic Education
Module:

1. General information

1.1. Aims of the course

The course and its provided results answer to the following plans and objectives.

- Basic professional knowledge.
- Learning skill.
- Analysis and synthesis skill.
- Innovating skill.
- Solving problems skill.
- Applying knowledge to practical action skill.
- Oral and written communication skill.
- Work responsibility.
- Work motivation.
- Independent work skill.
- Human relationships skill.
- Quality and improvement commitment.

It is a course whose contents by themselves still do not give skills to the student to contribute to the achievement of the 2030 Agenda, however they are essential to substantiate the subsequent knowledge of the rest of the degree that is more directly related to the SDGs and therefore the 2030 Agenda.

1.2. Context and importance of this course in the degree

The course aims to form the students for the design and graphical representation of geometrical figures, industrial parts and diverse objects, through the use of a universal language that allows its understanding by other technical personnel and its subsequent manufacturing process, and that follows the rules of the International Standards Organization - ISO.
Furthermore, on the base of this course, the rest of the courses with industrial drawing, design, technical office and projects contents of the degree are built.

1.3. Recommendations to take this course

The student needs to know the contents of the Technical Drawing course of Bachillerato, specially the methods and constructions of: triangles, quadrilateral shapes, regular polygons, locuses, technical curves, conical and cyclical curves, and a introduction to the multiview projection.

2. Learning goals

2.1. Competences

Specific competences:

C9: Spatial vision capability and graphical representation techniques knowledge, through traditional methods of metric and descriptive geometry, and through computer aided design and drafting applications.

Generic competences:

C6: Capability for the use of the techniques, skills and tools that are needed for the practise of the engineering.

C10: Capability for continuous learning and developing autonomous learning strategies.

2.2. Learning goals

1. Masters the resolution of problems that can arise in engineering.

2. Develops dexterities and abilities that allow expressing precisely, clearly and objectively graphical solutions.

3. Acquires the abstraction capability to view objects from different spatial positions.

2.3. Importance of learning goals

The learning goals that are obtained through the course are important because:

- They allow mastering the resolution of the different graphical problems that can arise in engineering.

- They develop skills and abilities to express clearly, objectively and universally, graphic solutions.

- They improve the abstraction capabilities that allow you to see an object from different spatial positions.

- They value the possibilities of technical drawing as a research tool.

- They value the possibilities of standardization as an ideal conventionalism to simplify, not only production, but also communication, appreciating the universality of the objective language in the transmission and understanding of information.

3. Assessment (1st and 2nd call)

3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

The student will have to show that has reached the learning goals through the next assesment tasks:

The assesment of the course will have two important calls that are provided in the official calendar, 1st and 2nd. It would be made in a different way for the CAD subject of the course versus the rest of the syllabus.

3.1.1 Computer Aided Design (CAD):

Its preferred assessment system will be continuous, but optionally it can be done through global exam.

CADD practices:

After the presentation of each of the six CAD practices, a grade will be awarded. The weighted sum of those grades will made the final CADD practices grade. This grade will be valid for both calls.

CAD global exam:

If a student does not carry out the practices, does not obtain the minimum grade to average or if he prefers, he will carry out in the global exam a specific practical exercise of CAD, on the dates determined by the official calendar of the EINA, which will result in the student's grade for this section. This note will be valid only in the call in which it is made.

For the final grade of the course, the CADD practices grade or, failing that, the CADD global exam grade will have a weight of 25%. The minimum grade to average with the rest is 4.0 out of 10.

With this assessment system, learning goals 2 and 3 will be evaluated.

3.1.2 Rest of the syllabus:

The rest of the syllabus is assessed in part by continuous assessment (optional) and in part by global assessment (mandatory).

Continuous evaluation

The continuous evaluation will be based on practical exercises, according to the contents learnt during classes. They will be delivered throughout the term on the dates indicated and will receive a grade. The weighted sum of these grades will constitute the note of the continuous evaluation. For the final grade of the subject, this note has a weight of 10%. The minimum grade in the section to average with the rest is 4.0 out of 10. This grade will be valid for both calls.

Global Exam

The global assesment will be carried out obligatorily by all the students who want to obtain a grade in the act of the course. It will be carried out by means of a global exam on the dates determined by the official calendar of the EINA. It will consist of a series of practical exercises on the rest of the syllabus. The minimum grade for each exercise to average and obtain the exam grade must be 1.0 out of 10. Once the exam grade has been obtained, the minimum grade for this exam to average

with the others is 4.0 out of 10. This grade will be valid only in the call in which it is made.

If a student obtains the minimum grade of 4.0 out of 10 in continuous evaluation, then for the final grade of the course, the grade of the global exam for the rest of the syllabus will have a weight of 50%.

If a student does not obtain the minimum grade, or if he prefers it, then for the final grade of the subject, the global exam for the rest of the syllabus will have a weight of 75%.

At any time throughout the term, a student may waive the continuous assessment of the rest of the syllabus and continue with the global assessment.

With this assessment system, learning outcomes 1, 2 and 3 will be evaluated.

Final grade

If a student does not take the global exam, his or her grade for the course will be Not presented.

If a student does not reach the minimum grades to average, his or her grade for the course will be Suspense and the numerical grade will be the grade for the section that limits the average.

If a student reaches the minimum grades to average, her final grade in the course will be obtained as the weighted sum of the grades to consider. To obtain the pass grade, a minimum grade of 5.0 out of 10 will be required.

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The methodology followed in this course is oriented towards the achievement of the learning objectives. It is based on participation and the active role of the student favours the development of communication and decision-making skills. A wide range of teaching and learning tasks are implemented, such as lectures, guided assignments, laboratory sessions, autonomous work, and tutorials.

Students are expected to participate actively in the class throughout the semester.

Further information regarding the course will be provided on the first day of class.

4.2. Learning tasks

The course includes 6 ECTS organized according to:

- Lectures: theory and practise sessions: 14 hours.
- Problem solving: 56 hours.
- Laboratory sessions: 18 hours.
- Assignments.
- Autonomous work.
- Questions solving during office hours.

Lectures and problems: the lecturer will explain the theoretical contents of the course and solve illustrative applied problems. These problems and exercises can be found in the problem set provided. Lectures and problems run for 3 weekly hours. Although it is not a mandatory activity, regular attendance is highly recommended.

Laboratory sessions: sessions will take place every 2 weeks (6 sessions in total) and they last 3 hours each. Students will work together in groups actively doing tasks such as practical demonstrations, measurements, calculations, and the use of graphical and analytical methods.

Assignments: students will complete assignments, problems and exercises related to concepts seen in problem sessions and lectures. They will be submitted to be discussed and analyzed.

Autonomous work: students are expected to spend about 75 hours to study theory, solve problems, prepare lab sessions, and take exams.

Office hours will be posted on the directorio.unizar.es website to assist students with questions and doubts. It is beneficial for the student to come with clear and specific questions.

4.3. Syllabus

UNIT 1.- INTRODUCTION TO GRAPHIC EXPRESSION, TOOLS AND EQUIPMENT FOR TECHNICAL DRAWING: Drawing as graphic language. Definition of Technical Drawing. normalization. Computer Aided Drawing. Development of CAD Useful for manual drawing.

UNIT 2.- SYSTEM OF DIMENSIONED PLANS: Introduction to Representation Systems. Representation of the geometric elements: point, line and plane. Situation of points and lines in a plane. Intersection of planes and lines with their particular cases. Resolution of building roofs: definition of terms, study of floor plan models buildings. Parallelism of lines and planes. Distance between points. Terrain representation: contour lines, tracing constant slope lines, terrain profiles, earthworks, road layout.

UNIT 3.- DIHEDRAL SYSTEM AND SURFACES: Introduction. Representation and alphabet of the point. representation and line alphabet. Representation and alphabet of the plane. Intersection of lines and planes with their particular cases. Parallelism. Perpendicularity: theorems and practical cases. Plane changes, favorable projections of a straight line,

favorable position of a plane, applications to single and double partial views. Turns, placement of the elements in favorable positions. Abatement of the elements of a plane. Distances, cases of minimum distance between two lines that intersect Angle measurement. Definition and generation of surfaces: representation and main characteristics. Intersection of surfaces. Surface development.

UNIT 4.- STANDARDIZATION IN TECHNICAL DRAWING: Formats, scales and line types. scratched. Lettering. sign or box. Dihedral views: partial views, local views, priority order of coincident lines, termination of reference lines, dashed and dashed-dotted lines, other conventions, views of mirrored parts, views interrupted, representation of repetitive elements, details, transgressions. Cuts and sections: difference, scratches, cutting planes, elements that are not scratched in longitudinal section, half cuts, folded sections, local cuts, successive sections. Dimensioning: general principles, dimensioning elements, dimensioning execution, indications specials.

UNIT 5.- COMPUTER AIDED DESIGN: Introduction and general operation. User interface. commands and Function keys. File management. Drawing aids. Coordinate systems. Editing orders. I work with layers. Text and shading. Dimension. Blocks and attributes: creation and insertion. Model space, paper space and printing.

PRACTICAL CLASSES.
Sessions 1 to 3: Learning to use a CAD tool.
Sessions 4 to 6: Problem solving using the CAD tool.

4.4. Course planning and calendar

Further details will be given during the first day presentation.

4.5. Bibliography and recommended resources

http://biblioteca.unizar.es/como-encontrar/bibliografia-recomendad