Universidad Zaragoza

Academic Year/course: 2021/22

30050 - Integrated Manufacturing

Syllabus Information

Academic Year: 2021/22
Subject: 30050 - Fabricación integrada
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 436 - Bachelor's Degree in Industrial Engineering Technology
ECTS: 6.0
Year: 4
Semester: Second semester
Subject Type: Optional
Module:

1. General information

2. Learning goals

3. Assessment (1st and 2nd call)

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The methodology followed in this course is oriented towards achievement of the learning objectives. It is based on participation and the active role of the student favors 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. The development of all the activities for the evaluation of the subject is carried out individually.

Classroom materials will be available via Moodle. These include a repository of the lecture notes used in class, the course syllabus, as well as other course-specific learning materials.

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 (1.2 ECTS): 30 hours.
- Laboratory sessions (0.72 ECTS): 18 hours.
- Guided assignments (0.48 ECTS): 12 hours.
- Autonomous work (3.6 ECTS): 90 hours.
- Tutorials.

Lectures: the professor 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 at the beginning of the semester. Lectures 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 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.

Guided assignments: students will complete assignments, problems and exercises related to concepts seen in laboratory

sessions and lectures. They will be submitted at the beginning of every laboratory sessions to be discussed and analyzed. If assignments are submitted later, students will not be able to take the assessment test.

Autonomous work: students are expected to spend about 90 hours to study theory, solve problems, prepare lab sessions, and take exams.

Tutorials: the professor's office hours will be posted on Moodle and the degree website to assist students with questions and doubts. It is beneficial for the student to come with clear and specific questions.

4.3. Syllabus

1) Mechanical design in process planning.

Geometric modeling systems (CAD).
Design rules for structural and aesthetic parts.

2) Manufacturing and rapid prototyping.

Prototyping and integration phases in the product development cycle.
Manufacturing technologies and rapid prototyping.
Reverse engineering.

3) Planning manufacturing processes.

Planning mechanical forming processes.
Tools for molding and deformation processes.

4) Analysis of the feasibility of manufacturing by CAE.

Finite element in manufacturing processes and planning stages.
Validation of manufacturing process.

5) Planning machining processes.

CNC machining systems and high performance machining.
Machining strategies in CAM systems.

6) Concurrent Engineering and PLM.

Planning manufacturing processes in Concurrent Engineering environments.
Product data management (PDM).
CAD / CAM / CAE systems. Data exchange standards.

Laboratory practices

1) Mechanical design of mechanical components: volumetric parts.
2) Mechanical design of molding tools and volumetric shaping. Specialized applications.
3) Mechanical design of mechanical components: sheet metal. Mechanical design of conventional matrices using generic 3D CAD.
4) Mechanical design of progressive matrices using specialized 3D CAD.
5) Viability analysis of complex conformation processes using specialized CAE.
6) 3D CAD reconstruction using reverse engineering techniques.

4.4. Course planning and calendar

For further details concerning the timetable, classroom and further information regarding this course please refer to the Escuela de Ingeniería y Arquitectura, EINA, website https://eina.unizar.es/.

4.5. Bibliography and recommended resources

Link:
http://biblos.unizar.es/br/br_citas.php?codigo=30050&year=2019