Universidad Zaragoza

Year : 2019/20

25883 - Advanced Materials and Processes

Syllabus Information

Academic Year: 2019/20
Subject: 25883 - Advanced Materials and Processes
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 558 - Bachelor's Degree in Industrial Design and Product Development Engineering
ECTS: 6.0
Year: 3
Semester: Second semester
Subject Type: Compulsory
Module: ---

1.General information

1.1.Aims of the course

1.2.Context and importance of this course in the degree

1.3.Recommendations to take this course

2.Learning goals

2.1.Competences

2.2.Learning goals

2.3.Importance of learning goals

3.Assessment (1st and 2nd call)

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

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. The methodology followed in this course is oriented towards the achievement of the learning objectives:

- The lectures for the complete group will deal with theoretical and practical objectives, complemented trough practical and
- Laboratory sessions. These sessions are done in small groups to promote teamwork. Another important aspect to be developed is student decision making. For this aim, several works are proposed during the semester.
- 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 the following learning tasks:

- Lectures: 42 hours.
- Laboratory sessions: 14 hours.
- Guided assignments: 25 hours.

- Autonomous work: 59 hours.
- Examination: 5 hours.

1 ECTS= 10 onsite hours

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. 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 75 hours to study theory, solve problems, prepare lab sessions, and take exams.

4.3.Syllabus

The course will address the following topics:

1. Metrology; dimensional measurement, form and roughness, measurement assessment.
2. Material removal processes; machining with geometrically well-defined tool edges, Electrical discharge Machining, Machining with geometrically undefined tool edges, cutting.
3. Automatization
4. Finishing machining processes; Machining with geometrically undefined tool edges, coatings, heat and chemical surface treatments.
5. ANALYSIS OF FAILURE IN SERVICE. Analysis methodology on damage and failure mechanisms. Investigation and identification techniques: non-destructive tests, metallography, electron microscopy, destructive tests. The technical report.
6. MATERIALS RECYCLING. Waste recovery: recycling. Definition and classification of waste. RSU collection and treatment (urban solid waste). Identification procedures, classification, separation and recovery. Recycling of specific products: containers for beverages, electronic scrap, used tires, etc. Materials in Ecodesign.
7. MODIFICATION OF SURFACES AND COATINGS. Classification. Classic surface treatments. New surface treatments. PVD (physical vapor deposition). CVD (chemical vapor deposition). Ionic implantation. Thermal projection. The laser applied to surface treatments.

4.4.Course planning and calendar

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Lectures	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
Problems session		x	x	x	x	x	x		x	x					
Laboratory sessions		A	B	A	B	A	B		-	A	B	A	B		
Individual work			A	B			A	B			-	A	B	A	B
Examination								x							x

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

4.5.Bibliography and recommended resources