Universidad Zaragoza

Year : 2018/19

30029 - Manufacturing Technology

Syllabus Information

Academic Year:	2018/19
Subject:	30029 - Manufacturing Technology
Faculty / School:	110 -
Degree:	436 - Bachelor's Degree in Industrial Engineering Technology
ECTS:	6.0
Year:	3
Semester:	Second semester
Subject Type:	Compulsory
Module:	---

General information

Aims of the course

Context and importance of this course in the degree

Recommendations to take this course

Learning goals

Competences

Learning goals

Importance of learning goals

Assessment (1st and 2nd call)

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

Methodology, learning tasks, syllabus and resources

Methodological overview

The learning process designed for this course is based on the following:

The proposed methodology seeks to promote continued student work and focus on the more practical aspects of machining processes planning and implementation of metrology instruments and tools for quality control.

In sessions with the whole group, the more theoretical aspects are considered with and completed with development problems and technical case study.

The practical sessions take place in smaller groups to work with specialized applications and mechanical engineering equipment workshop and manufacturing and metrology laboratory. It aims is to promote hands-on learning, so the attendance is advised to practical sessions where direct experience is gained with the machines and manufacturing systems. At the end of each practical session, the immediate realization of a small control or script is required. In some cases, the practice session enables data collection for a more elaborate work that makes possible better assimilation of knowledge related to the subject. Such controls and work are required in case of choosing the gradual evaluation

Learning tasks

The program offered to the students to help them to obtain the expected learning outcomes includes theoretical and practical lectures in the classroom, laboratory sessions and visits to companies.

In class work: 2.4 ECTS (60 hours)

1) Lectures (28 hours)

Oral presentations of theoretical concepts covering most of the contents of the subject. Its aim is to present the knowledge and skills that must be acquired by the student and facilitate their assimilation.

2) Problems sessions (14 hours)

These problems sessions are integrated with the lectures to facilitate learning and provide a practical and applied overview of different theoretical topics.

3) Laboratory sessions (18 hours)

Students arranged in small groups will realize six workshop or laboratory sessions that last three hours. These sessions complement the understanding of those concepts of the subject requiring the practical use of specific equipment.

Out-of-class work: 3.6 ECTS (90hours)

4) Individual work (85 hours).

The student should study all the theoretical topics and practice in the solution of problems. The student will be encouraged to work in a continuous manner by means of a uniform work load along the semester.

5) Examination tasks (5 hours)

They have a twofold goal: to grade the student academic progress, and to inform him about the learning level he have reached in the course.

Syllabus

Contents

1) Metrology

a. Inspection and industrial metrology.

b. Measurement assurance.

c. Systems and methods of measurement.

2) Quality

a. Fundamental concepts of quality.

b. Quality management.

c. Quality planning.

d. Quality in product design and process.

e. Manufacturing quality.

3) Fundamentals of machining processes

a. Movements and parameters in machining processes.

b. Technological aspects of the processes of turning, drilling and milling.

c. Tools: materials, geometry and selection criteria.

d. Abrasive machining processes

e. Non conventional machining processes: EDM

4) Mechanical cutting and machining economy

a. Mechanics of chip formation.

b. Kinematics and dynamics of metal cutting.

c. Machining energy balance.

d. Tool wear and lubrication.

e. High speed machining.

f. Optimization of machining.

5) Manufacturing Systems

a. Characterization of manufacturing systems and automation.

b. Tooling and fixturing.

c. Selection criteria of machining equipment.

d. Machine tool programming.

6) Process Planning

Laboratory sessions

1) Measurement and calibration in dimensional metrology.

2) Geometric measurement with conventional systems and 3D measuring systems.

3) QFD and FMEA.

4) Processes turning, drilling and milling.

5) Grinding and EDM processes. Tooling and fixturing.

6) Machine Tool Programming.

Course planning and calendar

6 ECTS: 150 hours / student distributed as follows:

The distribution of teaching (60 hours) is as follows:

* Lectures and development of technical cases and problem solving: 42 hours taught to the whole group, at 3 hours / week.

* Practical sessions in metrology laboratories and machining workshops: 18 hours spread over 6 sessions of 3 hours.

Bibliography and recommended resources