DEGREE CURRICULUM

MANUFACTURING TECHNOLOGIES

Coordination: NOGUES AYMAMI, MIQUEL

Academic year 2016-17

MANUFACTURING TECHNOLOGIES 2016-17

Subject's general information

Subject name	MANUFACTURING TECHNOLOGIES
Code	102309
Semester	2nd Q(SEMESTER) CONTINUED EVALUATION
Typology	<table><tr><th>Degree</th><th>Course</th><th>Typology</th><th>Modality</th></tr><tr><td>Bachelor's Degree in Mechanical Engineering</td><td>3</td><td>COMPULSORY</td><td>Attendance-based</td></tr></table>
ECTS credits	6
Groups	1GG,2GM,5GP
Theoretical credits	3
Practical credits	3
Coordination	NOGUES AYMAMI, MIQUEL
Department	INFORMATICA I ENGINYERIA INDUSTRIAL
Teaching load distribution between lectures and independent student work	40% lectures in class 60% independent student work
Important information on data processing	Consult this link for more information.
Language	Catalan Also some material could be in Spanish or in English
Distribution of credits	Miquel Nogués Aymamí 3 Juan Jose Gonzalez Fabra 7,2
Office and hour of attention	Miquel Nogués, Tuesday from 19:00 to 20:30 and Thursday from 10 to 11:30 Juan José González, Thursday from 18:00 to 20:00

MANUFACTURING TECHNOLOGIES 2016-17

Professor/a (s/es)	Adreça electrònica professor/a (s/es)	Crèdits	Horari de tutoria/lloc
GONZALEZ FABRA, JUAN JOSE	jgonza@diei.udl.cat	7,2	Thursday 18:00 to 20:00
NOGUES AYMAMI, MIQUEL	mnogues@diei.udl.cat	3	Monday 18:00 to 20:00 Tuesday 9:30 to 11:00

Subject's extra information

It is essential to have studied previously, and its advisable to have passed the following subjects:
- GRAPHICS EXPRESSION I.
- MATERIAL SCIENCE.
- THEORY OF MECHANISMS.
- ELASTICITY AND STRENGH OF MATERIALS I.
- MATERIALS FOR MECHANICAL MANUFACTURING.

Learning objectives

Provide students with the basic knowledge and techniques, tools, skills and abilities to effectively develop professionals activities involved in manufacturing of metal parts, due to its relevance in the industrial world. For this reason, the topics considered to be developed are: metrology, sheet metal work, machining processes and material removal, numerical control programming and welding and brazing systems.

Competences

Cross-disciplinary competences

- **EPS1**. Capacity to solve problems and prepare and defence arguments inside the area of studies.
- **EPS6**. Capacity of analysis and synthesis.

Specific competences

- **GEM25**. Knowledge and capacity for the application of materials engineering.
- **GEM26**. Applied knowledge of manufacturing systems and processes, metrology and quality control.

Subject contents

Unit 1 - METROLOGY

Unit 2 - METAL FORMING PROCESSES.

Unit 3 - MACHINING PROCESSES AND MATERIAL REMOVAL.

Unit 4 - NUMERICAL CONTROL.

Unit 5 - WELDING TECNOLOGIES

Unit 6 - RAPID PROTOTYPING

Unit 7 - UNCONVENCIONAL MACHINING PROCESSES.

Methodology

Lectures: theoretical contents and proposal and/or resolution of some practical examples.

Problems: Presentation and discussion of problems that will eventually solve by the students in an individual way or in groups.

Group work: Development of a study in groups on a set of different parts to be manufactured.

Practices: 9 laboratory sessions: metrology, sheet metal workshop, sheet metal design using CAD, lathe and mill machines, CN simulation using CIMCO (3 sessions), CAD/CAM, and welding and brazing.

Development plan

Week	Methodology	Unit	Attendance hours	Autonomous work hours
1	Lectures	Unit1: Theory Unit 1: Problems	2 0	0 0
2	Lectures Problems	Unit1: Theory Unit 1: Problems	2 2	3 3
3	Lectures Practice	Unit2: Theory Practice Metrology	2 2	3 3
4	Lectures Practice	Unit 2: Theory Practice sheet metal workshop	2 2	3 3
5	Lectures Problems	Unit 3: Theory Unit 2: Problems	2 2	3 3
6	Lectures Problems / Practice	Unit 3: Theory Unit 2: Problems Practice: design sheet metal parts using CAD	2 2	3 3
7	Lectures Practice	Unit 3: Theory Practice: lathe & mill machines	2 2	3 3
8	Lectures Problems	Unit 3: Theory Unit 3: Problems	2 2	3 3
9	Evaluation	Exam 1	2	4
10	Lectures Problems	Unit 4: Theory Unit 3: Problems	2 2	3 3
11	Lectures Practice	Unit 4: Theory Practice: CIMCO (I)	2 2	3 3
12	Lectures Practice	Unit 5: Theory Practice: CIMCO (I)	2 2	3 3
13	Lectures Practice	Unit 5: Theory Practice: CIMCO (I)	2 2	3 3
14	Lectures Practice	Unit 6: Theory Practice CAD/CAM	2 1	3 3
15	Lectures Practice	Unit 7: Theory Practice welding & brazing	2 2	3 3

16-17	Evaluation	Exam 2	2	4
18	Tutoring	Tutoring	1	2
19	Evaluation	Recovery exam	2	2

Evaluation

There will be several evaluation activities:

• 1st individual written exam (week 9). The content to be evaluated is the one exposed and worked in class up to the date of the exam. The exam will have two parts; one is multichoice text exam and problems to solve.

• Laboratory classes are mandatory to attend, and they will be evaluated by reports filled up by the student in group.

• Several developing work will be proposed, which must be done in groups, they should be uploaded by the scheduled date for evaluation.

• 2nd individual written exam (week 17 or 18). The content to be evaluated is the one exposed and worked in class from the 1rst written exam up to the date of the exam. The exam will have two parts; one is multichoice text exam and problems to solve.

• In order to pass the subject, it is necessary that the weighted note of the notes of the two written tests, according to the relative weight of each, must be equal to or greater than 3,5. If such minimum mark is not achieving, students must do the recovery exam.

• Recovery exam (week 20). The content to be evaluated in this exam is exposed in class and worked throughout the course. The exam will have two parts; one is multichoice text exam and problems to solve. If the student attend to this exam, the new grade obtained replaces the notes of the two previous written exams, whether it is greater as a minor. A minimum score of 3,5 in this exam is also established to pass the course.

The weight assigned to each evaluation activity, out of 100, is as follows:

Activity	Weight
1^{rst} exam	30
Laboratory reports	10
Work in groups	20
2nd exam	40
Recovery exam	70

Note: If the minimum grade of 3,5 in the written exam is not achieved, the mark of the subject will be the minimum of the result of the average, according to the above table or 3,5

Note: Laboratory reports and the exercises developed in group grades are not recoverable.

Bibliography

GROOVER, M.P. "Fundamentos de manufacturamoderna". Ed. Mc GrawHill 2007

KALPAKJIAN, S. "Manufactura: Ingeniería y Tecnología". Ed. PearsonEducación 2002

SCHEY, J."Introduction to manufacturing processes".Ed. Mc GrawHill 2000

Singh, R."Applied Welding Engineering". Ed. Elsevier Inc. 2012

SALUEÑA X. i NÁPOLES A. " Tecnología Mecánica". Ed.CPDA-ETSEIB. 2000

VIVANCOS, J."Procesos mecanizado". Tomo I. Ed.CPDA-ETSEIB. 1999.

VIVANCOS, J."Control Numèric". Ed. UPCBarcelona 1996.

COMPLEMENTARY BIBLIOGRAPHY

COCA, P. i ROSIQUE, J. "Tecnología Mecánica i Metrotécnia". Ed. Pirámide1984.

LASHERAS ESTEBAN,J.M. "Tecnologia mecánica i Metrotécnia". Ed.Donostiarra. 1987.

Falk, D. i Gockel, H."Metrotècnia Fundamental". Ed. Reverté, 1986.