

220207 - Machine Design and Manufacturing Technologies

Coordinating unit: 205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 712 - EM - Department of Mechanical Engineering
Academic year: 2019
Degree: MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2013). (Teaching unit Compulsory)
ECTS credits: 7,5 Teaching languages: Catalan, Spanish

Teaching staff

Coordinator: JASMINA CASALS TERRE
Others: LAURA CARRION LOPEZ
Farré Lladós, Josep

Degree competences to which the subject contributes

Specific:

1. Knowledge and ability to design and calculate integrated manufacturing.

Teaching methodology

The teaching methodology is divided in three parts:

Theoretical content sessions.

Lab sessions or Problem solving sessions

Autonomous work and homeworks

In the theoretical content sessions, teachers will introduce the theoretical foundations of the subject, concepts, methods and results illustrated with suitable examples to facilitate understanding.

In the problem solving sessions, the teacher will guide the student in the application of theoretical concepts for troubleshooting. Exercises will be proposed and solved in the classroom and outside the classroom, to promote contact and use of the basic tools necessary for the troubleshooting.

Students, independently, have to work the material provided by the teacher and the result of the sessions to assimilate and fix problem concepts. The faculty will provide a curriculum and activity tracking (ATHENA).

Learning objectives of the subject

The basic objectives of this subject are the following:

Machine elements design and manufacturing processes of metallic materials. Capacity to choose a particular manufacturing method for a part type, according to their properties and characteristics, number of parts to be manufactured ...

Calculation procedures for designing different machine elements, based on the most common failure criteria, and the implications of material fatigue.



220207 - Machine Design and Manufacturing Technologies

Study load

Total learning time: 187h 30m	Hours large group:	45h	24.00%
	Hours medium group:	0h	0.00%
	Hours small group:	22h 30m	12.00%
	Guided activities:	0h	0.00%
	Self study:	120h	64.00%

220207 - Machine Design and Manufacturing Technologies

Content

<p>Module 1: Introduction to the design and manufacturing of mechanical elements</p>	<p>Learning time: 4h Theory classes: 2h Self study : 2h</p>
<p>Description:</p> <ul style="list-style-type: none"> - Relation between the design and the manufacturing process. - Flexible and Concurrent engineering <p>Related activities:</p> <ul style="list-style-type: none"> Activity 3: Midtern Activity 4: Final 	
<p>Module 2: Machine element design</p>	<p>Learning time: 73h 30m Theory classes: 15h Laboratory classes: 8h 30m Self study : 50h</p>
<p>Description:</p> <ul style="list-style-type: none"> - Theory of mechanical fatigue and union. - Design, selection and calculation of non-permanent fasteners. - Design, selection and calculation of permanent fasteners. - Design, selection and calculation of transmission elements. - Design, selection and calculation of suspension elements <p>Related activities:</p> <ul style="list-style-type: none"> - Activity 1: Homework - Activity 2: Lab report - Activity 3: Midterm - Activity 4: Final 	

220207 - Machine Design and Manufacturing Technologies

<p>Module 3: Manufacturing Quality Control</p>	<p>Learning time: 32h Theory classes: 8h Laboratory classes: 6h Self study : 18h</p>
<p>Description:</p> <ul style="list-style-type: none"> - Process measurement and quality control in manufacturing. - Dimensional and geometric tolerances - Uncertainty of measurement - Functional Dimension - Surface Finish and Hardness <p>Related activities:</p> <ul style="list-style-type: none"> - Activity 1: Homework - Activity 2: Lab report - Activity 3: Midterm - Activity 4: Final 	
<p>Module 4 Manufacturing processes</p>	<p>Learning time: 78h Theory classes: 20h Laboratory classes: 8h Self study : 50h</p>
<p>Description:</p> <ul style="list-style-type: none"> - Design, calculation and molding tool manufacturing. - Design and fabrication of matrix calculation of hot metal deformation. - Design and fabrication of matrix calculation of cold metal forming. - Design, symbols and welding processes. - Machining Processes. - Prototyping Processes. <p>Related activities:</p> <ul style="list-style-type: none"> - Activity 1: Homework - Activity 2: Lab report - Activity 3: Midterm - Activity 4: Final 	

220207 - Machine Design and Manufacturing Technologies

Qualification system

The final grade depends on the following activities:

- Activity 1: Homeworks weight: 10%
- Activity 2: Lab reports, weight: 15%
- Activity 3: Midterm Exam, weight: 25%
- Activity 4: Final Exam, weight: 50%

All students unable to attend the third activity (midterm exam), or not pass, will have the option to retrieve the mark during the fourth activity (final exam). Students with a mark less than 5 can do this new exam. The mark achieved is higher it will replace the previous one.

Bibliography

Basic:

Budynas, R.G.; Nisbett, J.K. Diseño en ingeniería mecánica de Shigley. 8ª ed. México: McGraw-Hill, 2008. ISBN 9789701064047.

Salueña, Xavier; Nápoles, Amelia. Tecnología mecánica [on line]. 2ª ed. Barcelona: Edicions UPC, 2001 [Consultation: 08/01/2016]. Available on: <<http://hdl.handle.net/2099.3/36437>>. ISBN 8483014491.

Kalpakjian, S.; Schmid, Steven R. Manufactura, ingeniería y tecnología [on line]. 5ª ed. México: Pearson Educación, 2008 [Consultation: 04/10/2018]. Available on: <http://www.ingebook.com/ib/NPcd/IB_BooksVis?cod_primaria=1000187&codigo_libro=5323>. ISBN 9789702610267.

Complementary:

Gómez González, Sergio. Control de calidad en fabricación mecánica. Barcelona: Ceysa, 2002. ISBN 8486108217.

Fernández, J. Mª; Garrandés, C.Mª. Metrología en las PYMES: guía práctica. Llanera: Instituto Tecnológico de Materiales, 2003.