



IDENTIFYING DATA

Materials engineering

Subject	Materials engineering			
Code	V12G363V01502			
Study programme	Degree in Industrial Technologies Engineering			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	3rd	1st
Teaching language	English			
Department				
Coordinator	Collazo Fernández, Antonio Díaz Fernández, Belén			
Lecturers	Collazo Fernández, Antonio Díaz Fernández, Belén			
E-mail	acollazo@uvigo.es belenchi@uvigo.es			
Web	http://faiic.uvigo.es			
General description	This subject combines the scientific fundamentals that prove the relation structure-properties-performance with technological aspects such as the manufacturing processes and the service conditions.			

Competencies

Code

Learning outcomes

Expected results from this subject	Training and Learning Results
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Contents

Topic	
Mechanical behavior of materials	Plastic deformation
Properties of materials obtained by casting, molding and injection	Sheet-metal forming processes
Properties of materials obtained by plastic and viscoelastic deformation	Casting and casting defects
Processing of metal powders	Fractography
Modification of properties by heat treatments, thermochemical treatments and thermomechanical treatments	
Welding processes and weldability	
Construction materials	
Tool materials	
Laboratory contents	Mechanical properties tests Non-destructive testing Metallography Hardenability tests

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	33	66	99
Problem solving	7	7	14
Seminars	3	3	6

Laboratory practical	10	10	20
Mentored work	0	11	11

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

	Description
Lecturing	Presentations given by the lecturer of the main contents of the subject
Problem solving	Proposal of a set of problems/exercises that students must resolve by themselves. Guidelines, required formulas and common routines will be given in the classroom. Some problem will be resolved at the classroom, by the lecturer or by a student.
Seminars	Additional explanations to solve the main difficulties about the subject contents
Laboratory practical	Activities for application of the theoretical knowledge to particular situations and for the acquisition of basic skills and procedures related to the subject. Students will use the laboratories with the suitable equipment and devices.
Mentored work	Students, individually or in group, elaborate a document or presentation about some important topic related to the subject. Student can be asked to prepare a seminar, a short research, a summary of a document or conference...

Personalized assistance

Methodologies	Description
Mentored work	Personalized attention, the lecturer will guide the preparation of the project. Any difficulty/doubt will be attended. Independently on the teaching modality, this support can be provided electronically (email, videoconference, FAITIC forum ...) after being formally requested.
Seminars	Personalized attention, time devoted to help students with any difficulty or doubt. Independently on the teaching modality, this support can be provided electronically (email, videoconference, FAITIC forum ...) after being formally requested.

Assessment

	Description	Qualification Training and Learning Results
Lecturing	The assessment will be completed with a written exam of short questions, tests or exercises. The purpose is to assess the level of knowledge achieved along the course.	60
Laboratory practical	The laboratory activities will be assessed through the students attendance and participation, preparation of reports or visits to local companies.	25
Mentored work	It will be assessed by the handed reports and/or the exhibition in the classroom of the prepared project.	15

Other comments on the Evaluation

The continuous assessment will be followed during the teaching period of the subject according to the criteria established in the previous section. In the final exam, a minimum mark of 4 out of 10 is required in the own written exam to pass the subject. The date of the exam will be fixed by the school and can be checked at <http://eei.uvigo.es>. In case this minimum mark was not achieved, the whole mark will be that corresponding to the continuous assessment, this means that the mark of the final exam will not be added to the whole mark.

Students have the right to renounce to the continuous assessment system. This option must be asked officially. In this situation, the final exam will include the totality of the contents of the subject, and its qualification is 100%.

In the SECOND ATTEMPT (exam in July): The qualification obtained from the continuous assessment will be kept, unless the student request to be cancelled in due course. In this situation, the totality of the contents of the subject (those given in the classroom and in the laboratory) will be included in this final exam and the student could achieved 100% of the qualification. The date of the exam will be fixed by the school and can be checked at <http://eei.uvigo.es>.

EXTRAORDINARY CALL: the exam (questions, tests and/or exercises) will include the totality fo the contents and the qualification will be 100%.

Ethical commitment: student is expected to show an ethical behavior. In the case a non ethical behavior is detected (copy, plagiarism, use of forbidden electronic devices, or others), the student will failed with a qualification of 0%.

Sources of information

Basic Bibliography

Kalpajian, S. and Schmid, S. R., **Manufacturing Engineering and Technology**, Pearson/Prentice Hall,
 Mikell P. Groover, **Fundamentals of Modern Manufacturing: Materials, Processes, and Systems**, John Wiley & Sons,
 Dieter, G. E., **MECHANICAL METALURGY**, McGraw-Hill Book Company,
Complementary Bibliography
 Reina Gómez, M., **Soldadura de los aceros, aplicaciones.**, Gráficas Lormo,
 Sindo Kou, **Welding Metallurgy**, John Wiley & Sons,
 Krauss, G., **Steels: Heat Treatment and Processing Principles**, ASM International,
 Brooks, CH., **Principles of the Surface Treatment of Steels.**, Inc. Lancaster,
 Randall, M. G., **Sintering: Theory and Practice**, John Wiley & Sons,
 Beeley, P., **Foundry Technology**, Butterworth-Heinemann, Ltd.,

Recommendations

Subjects that are recommended to be taken simultaneously

Manufacturing engineering/V12G363V01604

Subjects that it is recommended to have taken before

Materials science and technology/V12G363V01301

Fundamentals of manufacturing systems and technologies/V12G363V01402

Mechanics of materials/V12G363V01404

Contingency plan

Description

=== EXCEPTIONAL PLANNING ===

Given the uncertain and unpredictable evolution of the health alert caused by COVID-19, the University of Vigo establishes an extraordinary planning that will be activated when the administrations and the institution itself determine it, considering safety, health and responsibility criteria both in distance and blended learning. These already planned measures guarantee, at the required time, the development of teaching in a more agile and effective way, as it is known in advance (or well in advance) by the students and teachers through the standardized tool.

=== ADAPTATION OF THE METHODOLOGIES ===

* Methodologies

They will be adapted to the telematic tools available for the lectures. Modifications in the provided information given through FaiTIC, email or Campus Remoto will be eventually done as well.

* Non-attendance mechanisms for student attention (tutoring)

The tutoring could be given in person (provided that the health measures are guaranteed) or telematic (e-mail, Campus Remoto or FaiTIC forums) under the modality of previous agreement. A methodological adaptation will be made to students at risk, providing them with additional specific information, if it is proven that they cannot access the contents in a conventional way.

=== ADAPTATION OF THE TESTS ===

Those tests that are already being carried out telematically will be maintained and, as far as possible, the on-site tests will be maintained, adapting them to the current health regulations. The tests will be carried out in person, unless the Rector's Resolution indicates that they should be carried out in a non-presential manner, using the several tools available to the teaching staff. Those tests that cannot be carried out by telematic means will be replaced by others (guided autonomous work, etc.)

* Modification in the continuous assessment.

Continuous assessment [Previous Weight 40%] [Proposed Weight 60%]