



IDENTIFYING DATA

Machine design and testing

Subject	Machine design and testing			
Code	V12G360V01602			
Study programme	Grado en Ingeniería en Tecnologías Industriales			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	3rd	2nd
Teaching language	Spanish Galician English			
Department				
Coordinator	Yáñez Alfonso, Pablo			
Lecturers	Fernández Álvarez, José Manuel Yáñez Alfonso, Pablo			
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General description	<p>This subject is intended to allow the students to apply the fundamentals of Mechanism and Machines Theory to the design of machines as well as the necessary knowledge, comprehension, and application of these concepts concerning to the field of Mechanical engineering.</p> <p>It also provides the students with the most important concepts related to the design of machines. The students will know and apply analysis methods for the design of machines by applying analytical methods or/and through the effective use of simulation software.</p>			

Training and Learning Results

Code	
B3	CG3 Knowledge in basic and technological subjects that will enable them to learn new methods and theories, and equip them with versatility to adapt to new situations.
B4	CG4 Ability to solve problems with initiative, decision making, creativity, critical thinking and to communicate and transmit knowledge, skills and abilities in the field of Industrial Engineering.
B5	CG5 Knowledge to carry out measurements, calculations, assessments, appraisals, surveys, studies, reports, work plans and other similar works.
B6	CG6 Capacity for handling specifications, regulations and mandatory standards.
B11	CG11 Knowledge, understanding and ability to apply the legislation relating to industrial installations.
C13	CE13 Knowledge of the principles of the theory of machines and mechanisms.
C26	CE26 Knowledge and abilities to calculate, design and test machines.
D2	CT2 Problems resolution.
D9	CT9 Apply knowledge.
D16	CT16 Critical thinking.
D20	CT20 Ability to communicate with people not expert in the field.

Expected results from this subject

Expected results from this subject	Training and Learning Results		
Knowledge of calculation methods applied in Mechanical design.	B3	C13	D2
	B4	C26	D9
	B5		D16
Knowledge and design capabilities applied in mechanical power transmissions.	B6	C13	D2
		C26	D9
			D16
			D20

Knowledge of the fundamental laws applied in the study of machine elements.	B11	C13 C26	D2 D9 D16 D20
Calculation capabilities and analysis applied for different machine components.	B3 B11	C13 C26	D2 D9 D16

Contents

Topic	
Mechanical design	1. Design vs. static loads 2. Design vs. dynamic loads
Power Transmissions	3. Introduction to power transmission systems 4. Gears (spur, bevel, and worm gears) 5. Axles and shafts
Machine elements	6. Clutches and brakes 7. Bolted joints and power screws 8. Plain and ball bearings

Planning

	Class hours	Hours outside the classroom	Total hours
Problem solving	9	30	39
Laboratory practical	18	47	65
Lecturing	23	19.5	42.5
Problem and/or exercise solving	5.5	0	5.5
Problem and/or exercise solving	1	0	1

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

Methodologies

	Description
Problem solving	Discussion of exercises
Laboratory practical	Practical sessions including specific material and software tools.
Lecturing	Lectures about the topics of the subject

Personalized assistance

Methodologies	Description
Laboratory practical	There is only one practice group available for the classes held in English, so students must attend to their assigned group

Assessment

	Description	Qualification	Training and Learning Results	
Laboratory practical	Attendance and participation as well as practices reports, papers, and tests will be rated. However, to be evaluated, students must attend a minimum of 7 practice sessions; otherwise, students won't be evaluated and will get 0 points. Learning outcomes: all will be graded	30	C13 C26	D2 D9 D16 D20
Problem and/or exercise solving	It will evaluate in questionnaires focused to the corresponding problems to the knowledges given during the classes of classroom and laboratory. They evaluate all the results of learning.	30	B3 B4 B5 B6	C13 C26 D9 D16
Problem and/or exercise solving	Final and mid-term tests will be focused on the contents taught at classes and laboratory sessions. Learning outcomes: all will be graded	40	B11 C26	C13 D9 D16

Other comments on the Evaluation

General outline 1 Edition

1 . Practical asynchronous quizzes; Term 1 week; Max grade: 3; Minimum grade: 1; Type of min.: Sum; Results are saved for 2 ED.

2 . Asynchronous Questionnaires; Term 1 week; Limited time: 1 hour; Max grade: 3; Minimum note: 1; Type of min.: Sum; No

results are saved for 2 ED.

3 . Academic final exam; official date; Limited time: 1 hour; Max grade: 4 ; Note min.: 1.5; Type of min.: Veto; If the minimum is not reached, the maximum grade of the subject is 3 out of 10.

General scheme 2 Edition

1 . Practical asynchronous quizzes; Term 1 week; Max grade: 3; Minimum note: 1; Type of min.: Sum; Results of the 1 ED are saved.

2 . Academic final exam; official date; ; Max grade: 7 ; Note min.: 2.8; Type of min.: Veto; If the minimum is not reached, the maximum score of the subject is 3.9 out of 10.

General outline Disclaimer EC 1 Edition

1 . Practical exam; Max grade: 3; Minimum grade: 1; Type of min.: Sum; Results are saved for 2 ED.

2 . Academic final exam; official date; ; Max grade: 7 ; Note min.: 2.8; Type of min.: Veto; If the minimum is not reached, the maximum score of the subject is 3.9 out of 10.

General outline Disclaimer EC 2 Edition

1 . Practical exam; Max grade: 3; Minimum grade: 1; Type of min.: Sum; Results of the 1 ED are saved.

2 . Academic final exam; official date; ; Max grade: 7 ; Note min.: 2.8; Type of min.: Veto; If the minimum is not reached, the maximum score of the subject is 3.9 out of 10.

"Ethical commitment: The student is expected to present adequate ethical behavior. In case of detecting unethical behavior (copying, plagiarism, use of unauthorized electronic devices, and others) it will be considered that the student does not meet the necessary requirements to pass subject. In this case, the overall grade for this academic year will be fail (0.0)."

The use of any electronic device during the evaluation tests will not be allowed unless expressly authorized. The fact of introducing an unauthorized electronic device into the exam room will be considered a reason for not passing the subject in this academic year and the overall grade will be failed (0.0)."

*A numerical rating system from 0 to 10 points will be used according to current legislation (RD 1125/2003 of September 5, BOE of September 18).

Sources of information

Basic Bibliography

Norton, R., **Machine Design. An Integrated Approach**, Pearson, 2012

Shigley, J.E, **Mechanical Engineering Design**, 9ª edición, Mc Graw Hill, 2012

Norton, R., **Diseño de Máquinas. Un Enfoque Integrado**, Pearson, 2012

Shigley, J.E, **Diseño de en Ingeniería Mecánica**, 9ª edición, Mc Graw Hill, 2012

Complementary Bibliography

Mott, Robert L., **Machine Elements in Mechanical Design**, Pearson, 2006

Lombard, M, **Solidworks 2013 Bible**, Wiley, 2013

Hamrock, Bernard J, et al., **Fundamental Machine Elements**, Mc Graw Hill, 2000

Mott, Robert L., **Diseño de elementos de máquinas**, Pearson, 2006

Hamrock, Bernard J, et al., **Elementos de Máquinas**, Mc Graw Hill, 2000

Recommendations

Subjects that it is recommended to have taken before

Materials science and technology/V12G360V01301

Mechanics of materials/V12G360V01404

Mechanism and machine theory/V12G360V01303

Other comments

Requirements: to enrol in this subject, it is mandatory to have passed or at least, to have been enrolled in all the subjects in previous years.

In case of discrepancies, the Spanish version of this guide prevails.