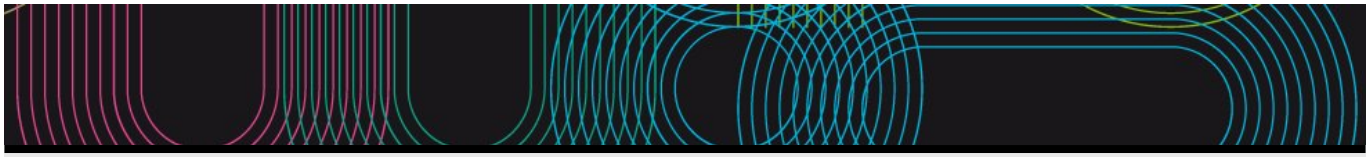

IDENTIFYING DATA				
Machine design and testing				
Subject	Machine design and testing			
Code	V12G360V01602			
Study programme	Grado en Ingeniería en Tecnologías Industriales			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	3rd	2nd
Teaching language	Spanish Galician English			
Department				
Coordinator	Yáñez Alfonso, Pablo			
Lecturers	Fernández Álvarez, José Manuel González Baldonedo, Jacobo Yáñez Alfonso, Pablo			
E-mail	pyanez@uvigo.es			
Web	http://moovi.uvigo.gal/			
General description	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. 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.			

Skills	
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.

Learning outcomes			
Expected results from this subject	Training and Learning Results		
Knowledge of calculation methods applied in Mechanical design.	B3 B4 B5	C13 C26	D2 D9 D16
Knowledge and design capabilities applied in mechanical power transmissions.	B6	C13 C26	D2 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	20		C13 C26	D2 D9 D16 D20
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	60	B3 B4 B5 B6	C13 C26	D2 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	20	B11	C13 C26	D9 D16

Other comments on the Evaluation

Students must achieve at least 5 points (out of 10 points) to pass the subject, according the following rules:

1. Students are required to attend and utilized the laboratory/Computer room.Practices reports, papers, and tests for each practice session as well as proposed works/papers from tutorials will be evaluated and graded with a maximum of 2 points of the final grade. This grade will be kept for the second term in the student's evaluation records (July). To be evaluated, students must attend a minimum of 7 practice sessions; otherwise, students won't be evaluated

and will get 0 points.

2. For those students who have been officially granted the right to waive their continued evaluation, there will be a mandatory final test where they will be able to get a maximum grade of 2 points. However, an advanced request must be made to the professor to prepare the necessary materials for this test.
3. The final test will consist in short answer questions and problems, where the distribution of 20% and 60% of the final grade is simply an indicative percentage, depending on each examination sitting. The final test will have a maximum grade of 8 points.

* Grades are calculated using a system of numerical qualification from 0 to 10 points conforming to the Spanish current legislation (RD 1125/2003, 5 September; BOE 18 September).

Ethical commitment: An adequate ethical behaviour of the student is expected at all times. In case an unethical behaviour is detected (copying, plagiarism, unauthorized use of electronic devices, and others); the student will be considered unfit to meet the necessary requirements to pass the subject. In this case, the overall qualification in the current academic year will be a Fail grade (0.0).

The use of any electronic devices during tests is completely forbidden unless is specified and authorized. The fact of introducing unauthorized electronic devices in the examination room will be considered reason enough to fail the subject in the current academic year and the overall qualification will be a Fail grade (0.0).

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.