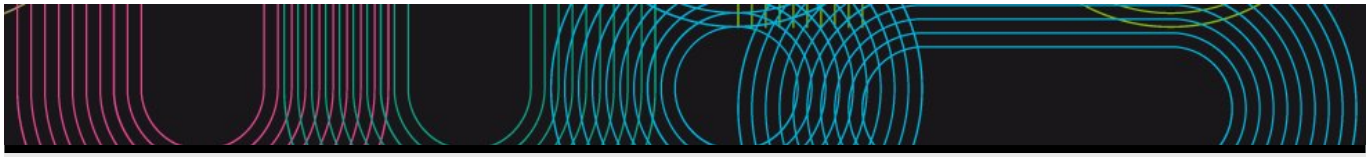

IDENTIFYING DATA				
Mechanism and machine theory				
Subject	Mechanism and machine theory			
Code	V12G380V01306			
Study programme	Degree in Mechanical Engineering			
Descriptors	ECTS Credits	Type	Year	Quadmester
	6	Mandatory	2nd	1st
Teaching language	Spanish Galician English			
Department				
Coordinator	Fernández Vilán, Ángel Manuel Segade Robleda, Abraham			
Lecturers	Fernández Vilán, Ángel Manuel González Baldonedo, Jacobo López Campos, José Ángel Segade Robleda, Abraham			
E-mail	asegade@uvigo.es avilan@uvigo.es			
Web	http://faitic.uvigo.es			
General description	This subject is intended to provide the students with basic knowledge about Mechanism and Machine Theory as well as his applications in the field of Mechanical engineering. It also covers and provides the students with the most important concepts related with Mechanism and Machine Theory. The students will know and apply kinematic and dynamic analysis methods for mechanical systems both with graphical and analytical methods and also through effective use of simulation software. Furthermore, this subject serves as an introduction of some aspects about machinery design; a topic that will be cover thoroughly in future subjects of the Degree.			

Competencies		
Code		Typology
CG3	CG3 Knowledge in basic and technological subjects that will enable students to learn new methods and theories, and provide them the versatility to adapt to new situations.	• know • Know How • Know be
CG4	CG4 Ability to solve problems with initiative, decision making, creativity, critical thinking and the ability to communicate and transmit knowledge and skills in the field of industrial engineering in Mechanical specialty.	• know • Know How • Know be
CE13	CE13 Knowledge of the principles of the theory of machines and mechanisms.	• know • Know How • Know be
CT2	CT2 Problems resolution.	• know • Know How • Know be
CT6	CT6 Application of computer science in the field of study.	• know • Know How • Know be
CT9	CT9 Apply knowledge.	• know • Know How • Know be
CT10	CT10 Self learning and work.	• know • Know How • Know be
CT16	CT16 Critical thinking.	• know • Know How • Know be

Learning outcomes	
Learning outcomes	Competences
To know the fundamentals of Mechanism and Machines Theory, and the application of these concepts concerning to the field of Mechanical engineering to solve problems related with this subject in the Industrial Engineering field.	CG3 CG4 CE13 CT2 CT6 CT9 CT10 CT16
To know, comprehend, apply, and practice the concepts related to Mechanism and Machines Theory.	CG3 CG4 CE13 CT2 CT6 CT9 CT10 CT16
To know and apply kinematic and dynamic analyses techniques to mechanical systems.	CG3 CG4 CE13 CT2 CT6 CT9 CT10 CT16
Efficiently know and utilize software for analysis of mechanisms.	CG3 CG4 CE13 CT2 CT6 CT9 CT10 CT16

Contents	
Topic	
Introduction to mechanism and machine theory	Introduction Definition of Machine, Mechanism and Kinematic Chain Link/part and linkage/joint Classification Kinematic Diagram, modeling, and symbology (nomenclature) Mobility Degrees of freedom Synthesis of mechanisms
Geometrical analysis of mechanisms.	Introduction Calculation methods of placement Loop closure equations
Kinematic analysis of mechanisms	Fundamentals Graphical methods Analytical methods Matrix methods
Static analysis of mechanisms	Fundamentals Force reduction (Graphical Methods) Work/Power Virtual Methods
Dynamic analysis of mechanisms	Fundamentals Machine general dynamics Machine Work and Power Balanced Dynamics of rotors
Cam mechanisms	Fundamentals Flat cams Cam synthesis
Power transmission mechanisms	Fundamentals Gears Mechanism Other mechanisms

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	23	19.5	42.5
Problem solving	9.5	30	39.5
Laboratory practical	18	47	65
Essay questions exam	3	0	3

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

Methodologies

	Description
Lecturing	Master class where the theoretical concepts are explain
Problem solving	Problem solving using the theoretical concepts presented in the Master Lesson
Laboratory practical	Practical tasks developed at the teaching laboratory or computer lab.

Personalized assistance

Methodologies	Description
Lecturing	Group or individual tutorials will be held during office hours to strengthen the acquired knowledge and to guide and assess the proposed works/papers .
Problem solving	Group or individual tutorials will be held during office hours to strengthen the acquired knowledge and to guide and assess the proposed works/papers.
Laboratory practical	Group or individual tutorials will be held during office hours to strengthen the acquired knowledge and to guide and assess the proposed works/papers.

Assessment

	Description	Qualification	Evaluated Competencess
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	CG3 CG4 CE13 CT2 CT6 CT9 CT10 CT16
Essay questions exam	Final and mid-term tests will be focused on the contents taught at classes and laboratory sessions. Learning outcomes: all will be graded.	80	CG3 CG4 CE13 CT2 CT9 CT10 CT16

Other comments on the Evaluation

Students must achieve a 5 or higher grade* to pass the subject, following these 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 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).
Tests Schedule: This information can be found along with any updates at the center (university) webpage.

Sources of information

Basic Bibliography

Munir Khamashta, Problemas resueltos de cinemática de mecanismos planos, UPC, 1992
Munir Khamashta, Problemas resueltos de dinámica de mecanismos planos, UPC, 1992
Calero Pérez, R. y Carta González, J.A., Fundamentos de mecanismos y máquinas para ingenieros, McGraw-Hill, 1999

Complementary Bibliography

García Prada, J.C. Castejón, C., Rubio, H., Problemas resueltos de Teoría de Máquinas y mecanismos, THOMSON, 2007
Cardona, S. y Clos D., Teoría de Máquinas., UPC, 2001
Shigley, J.E.; Uicker J.J. Jr., Theory of Machines and Mechanisms, McGraw-Hill, 1988
Hernández A, Cinemática de mecanismos: Análisis y diseño, SÍNTESIS, 2004
Lamadrid Martínez, A.; Corral Sáiz, A., Cinemática y Dinámica de Máquinas, E.T.S.I.I.T, 1969
Mabie, Reinholtz, Mechanisms and dynamics of machinery, Limusa-wyley, 2001
Nieto, j., Síntesis de Mecanismos, AC, 1978
Erdman, A.G.; Sandor, G.N.,, Mechanism Design: Analysis and Synthesis, PRENTICE HALL, 1998
Simon A.; Bataller A; Guerra .J.; Ortiz, A.; Cabrera, J.A., Fundamentos de teoría de Máquinas, BELLISCO, 2000
Kozhevnikov SN, Mecanismos, Gustavo Gili, 1981

Recommendations

Subjects that continue the syllabus

Machine design I/V12G380V01304
Automobiles and railways/V12G380V01941
Design of hydraulic machines and oleo-pneumatic systems/V12G380V01914
Machine design II/V12G380V01911
Computer-aided mechanical design/V12G380V01915
Transport engineering/V12G380V01945
Thermal engines and machines/V12G380V01913
Systems for data analysis, simulation and validation/V12G380V01933
Hybrid and electric automotive vehicles/V12G380V01944

Subjects that it is recommended to have taken before

Graphic expression: Graphic expression/V12G380V01101
Physics: Physics I/V12G380V01102
Mathematics: Algebra and statistics/V12G380V01103
Mathematics: Calculus I/V12G380V01104
Mathematics: Calculus II and differential equations/V12G380V01204

Other comments

Requirements: to enrol in this subject, it is mandatory to have passed or at least, to be enrolled of all first year subjects.
In case of discrepancies, the Spanish version of this guide prevails.