UNIVERSIDADE DA CORUÑA

Teaching Guide				
Identifying Data				2016/17
Subject (*)	TEORÍA DE MÁQUINAS		Code	730G04019
Study programme	Grao en enxeñaría en Tecnoloxías Industriais			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	2nd four-month period	Second	Obligatoria	6
Language	Spanish			
Teaching method	Face-to-face			
Prerequisites				
Department	Enxeñaría Industrial 2			
Coordinador	Cuadrado Aranda, Francisco Javier	E-mail	javier.cuadrado@udc.es	
Lecturers	Cuadrado Aranda, Francisco Javier Lugris Armesto, Urbano	E-mail	javier.cuadrado@udc.es urbano.lugris@udc.es	
Web	lim.ii.udc.es/docencia/iin-teomaq			
General description	Kinematics and dynamics of machines.			

Study programme competences	
Code	Study programme competences
A13	Coñecemento dos principios de teoría de máquinas e mecanismos.
B1	Que os estudantes demostren posuír e comprender coñecementos nunha área de estudo que parte da base da educación secundaria xeral e adoita encontrarse a un nivel que, aínda que se apoia en libros de texto avanzados, inclúe tamén algúns aspectos que implican coñecementos procedentes da vangarda do seu campo de estudo
B2	Que os estudantes saiban aplicar os seus coñecementos ao seu traballo ou vocación dunha forma profesional e posúan as competencias que adoitan demostrarse por medio da elaboración e defensa de argumentos e a resolución de problemas dentro da súa área de estudo
B4	Que os estudantes poidan transmitir información, ideas, problemas e solucións a un público tanto especializado como leigo
B5	Que os estudantes desenvolvan aquelas habilidades de aprendizaxe necesarias para emprenderen estudos posteriores cun alto grao de autonomía
B7	Ser capaz de realizar unha análise crítica, avaliación e síntese de ideas novas e complexas
B9	Adquirir unha formación metodolóxica que garanta o desenvolvemento de proxectos de investigación (de carácter cuantitativo e/ou cualitativo) cunha finalidade estratéxica e que contribúan a situarnos na vangarda do coñecemento
C4	Valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben enfrontarse.
C5	Asumir como profesional e cidadán a importancia da aprendizaxe ao longo da vida.
C6	Valorar a importancia que ten a investigación, a innovación e o desenvolvemento tecnolóxico no avance socioeconómico e cultural da sociedade.

Learning outcomes			
Learning outcomes	Study programme competences		
Ability to carry out kinematic analysis of mechanisms and machines. Ability to perform forward and inverse dynamics analysis of mechanisms and machines.	A13	B1 B2 B4 B5 B7 B9	C4 C5 C6

Contents	
Topic	Sub-topic

Topological analysis of mechanisms.	Definitions: mechanism, element, joint, degrees of freedom. Clasification of elements and joints. Degrees of freedom of a mechanism.
Kinematical analysis of mechanisms.	Point kinematics: position, velocity and acceleration. Distribution of velocities and accelerations in a rigid body. Relative motion of a material point. Relative motion of a rigid body. Rolling kinematics. Particularization to plane motion.
Dynamic analysis of mechanisms.	Fundamentals. Direct dynamic analysis of mechanisms. Inverse dynamic analysis of mechanisms.
Vibration of single DOF systems.	Introduction. Equation of motion of a single DOF system. Free vibrations. Forced vibrations.
Cams and gears.	Classification of cams and followers. Displacement diagrams. Kinematics and dynamics of cams and followers. Classification of gears. Fundamental law of gear-tooth action, involute curve. Spur gears. Helical gears. Gear dynamics. Gear trains.

Planning				
Methodologies / tests	Competencies	Ordinary class hours	Student?s personal work hours	Total hours
Guest lecture / keynote speech	A13 B4 B5 B7 B9 C4 C5 C6	24	36	60
Problem solving	A13 B4 B5 B7 B9	33	51	84
Objective test	A13 B1 B2	3	0	3
Personalized attention		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	
Methodologies	Description
Guest lecture / keynote speech	Chalkboard lectures, with occasional slides in order to show complex figures, pictures, plots, etc. Students will take notes and study the matter on their own.
Problem solving	Resolution of problems on the chalkboard. Students take notes. In addition, they have available a collection of solved problems, in order to be able to work on their own.
Objective test	Written test, with cocept questions and problems.

Personalized attention	
Methodologies	Description
Problem solving	Hours devoted to tutoring are intended to clarify the doubts arisen while the students study the theory and prepare the problems.

Assessment			
Methodologies	Competencies	Description	Qualification
Objective test	A13 B1 B2	The test consists of concept questions and problems. The evaluation criterion is whether the student shows enough understanding of the matter.	100
Others			

Assessment comments

Sources of information	
Basic	- CALERO R. y CARTA J.A., "Fundamentos de Mecanismos y Máquinas para Ingenieros", McGraw-Hill, 1999. - ERDMAN, A.G. y SANDOR, G.N., "Diseño de Mecanismos", 3ª ed., Prentice-Hall, 1998. - MABIE, H.H. and REINHOLTZ, C.F., "Mechanisms and Dynamics of Machinery", Wiley, 1987. - NORTON, R.L., "Diseño de Maquinaria", 3ª ed., McGraw-Hill, 2004. - UICKER, J.K., PENNOCK, G.R. and SHIGLEY, J.E., "Theory of Machines and Mechanisms", 3rd ed., Oxford University Press, 2003.- RAO, S., "Mechanical Vibrations", Addison-Wesley, 1995.
Complementary	- BARTON, L.O., "Mechanism Analysis", 2nd edition, Marcel Dekker, 2001. - JOSEPHS, H. and HUSTON, R.L., "Dynamics of Mechanical Systems", CRC Press, 2002. - HERNANDEZ, A., "Cinemática de Mecanismos", Editorial Síntesis, 2004. - RAMAMURTI, V., "Mechanics of Machines", CRC Press, 2002. - WALDRON, K.J and KINZEL, G.L., "Kinematics, Dynamics, and Design of Machinery", Wiley, 1999.

Recommendations
Subjects that it is recommended to have taken before
EXPRESION GRAFICA/730G04002 FÍSICA I/730G04003
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
TECNOLOXÍAS DA FABRICACIÓN/730G04022
Other comments

(*)The teaching guide is the document in which the URV publishes the information about all its courses. It is a public document and cannot be modified. Only in exceptional cases can it be revised by the competent agent or duly revised so that it is in line with current legislation.