



IDENTIFYING DATA

Automobiles and railways

Subject	Automobiles and railways			
Code	V12G380V01941			
Study programme	Degree in Mechanical Engineering			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	4th	1st
Teaching language	Spanish Galician			
Department				
Coordinator	Izquierdo Belmonte, Pablo			
Lecturers	Izquierdo Belmonte, Pablo			
E-mail	pabloizquierdob@uvigo.es			
Web	http://faitic.uvigo.es			
General description	Knowledges on vehicles cars and rail vehicles: description of his elements and vehicular dynamics			

Competencies

Code	
B3	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.
B4	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.
C13	CE13 Knowledge of the principles of the theory of machines and mechanisms.
C20	CE20 Knowledge and abilities to calculate, design and test machines.
D3	CT3 Oral and written proficiency.
D6	CT6 Application of computer science in the field of study.
D10	CT10 Self learning and work.
D16	CT16 Critical thinking.
D17	CT17 Working as a team.
D20	CT20 Ability to communicate with people not expert in the field.

Learning outcomes

Expected results from this subject	Training and Learning Results	
Comprise the operation of the main systems of the car and of the railway	B3 B4	D10 D16
Skill to make calculations of vehicular dynamics	C13 C20	D6 D10 D16
Capacity to design systems and components of the car and of the railway		D3 D6 D10 D16 D17 D20

Contents

Topic	
Introduction to the theory of the vehicles cars.	<ul style="list-style-type: none"> - The vehicle car, concept. - Main requests of the vehicle car. - The system man-machine-half. - Objective and scope of the theory of the vehicles cars

Interaction between the vehicle and the surface of rolling	<ul style="list-style-type: none"> - Characteristic generals and mechanics of the tyre, mechanical characteristics. - Study of longitudinal efforts (traction, braked) and *trasversales (derive). - Mathematical models floor-wheel
Aerodynamics of the cars	<ul style="list-style-type: none"> - Aerodynamic actions on the solids, general concepts - aerodynamic Actions on the vehicle car.
Longitudinal dynamics. Provision	<ul style="list-style-type: none"> - Dynamic longitudinal: Resistance to the movement. And fundamental Equation of the longitudinal movement - Provision: estimate of provision of the vehicle - tractive Effort maximum and limitation by the *adherencia.
Braked of vehicles cars	<ul style="list-style-type: none"> - Strengths and moments that act in the process of braked. - Conditions imposed by the *adherencia for braked optimum. - System of braked and process of braked. - The system *ABS
The system of *transmisión	<ul style="list-style-type: none"> - Characteristic of the engine and transmission. - Principles of design of the system of transmission and his elements
Lateral dynamics of the vehicle	<ul style="list-style-type: none"> - Analysis of the transversal behaviour of the vehicle - of the system of direction - Geometry of the direction. - Manoeuvrability to low speed. - Speed limit of *derrape and dump. - Directional behaviour of the vehicle in diet *estacionario.
The system of suspension	<ul style="list-style-type: none"> - Analysis of the vertical behaviour of the vehicle and of the system of suspension. - The vibrations on the vehicle, action on the human being. - The system of suspension: mathematical model. - Cinematic of the suspension. - Systems of suspension: elastic elements and of absorption. - Influence of the suspension in the behaviour of the vehicle. - Adjustments of the suspension.
Systems of security in the car	<ul style="list-style-type: none"> - Active and passive security. - Systems of help to the driving: control of traction and stability, *ABS. - Influence of the technician of driving. - The passive security: structures *deformables, cell of security, belts of security, *airbag. <p>- Analysis of the road infrastructure: Influence of the road infrastructure in the dynamic behaviour of the vehicle</p>
Railways	<ul style="list-style-type: none"> - Reforms of importance in vehicles cars: Rule and execution of reforms - Rail infrastructures - Typology of vehicles railways - Systems of the rail vehicles: traction, suspension, etc. - Elements *rodantes

Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	15	32	47
Problem solving	15	30	45
Laboratory practical	5	6	11
Computer practices	12	12	24
Essay questions exam	3	0	3
Practices report	0	20	20

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

Methodologies

	Description
Lecturing	Exhibition of the subjects with multimedia support
Problem solving	Resolution of problems of the different contents
Laboratory practical	Analysis of real elements of the car
Computer practices	Calculations and simulations of the vehicular behaviour

Personalized assistance

Methodologies	Description
Problem solving	Resolution of doubts during the session. Supervision of the professor in the classroom with attention to demand for explanation of contents. *Tutorías Personalised for explanation of doubts in the resolution of exercises.
Laboratory practical	Review put to place
Computer practices	Review put to place
Lecturing	Resolution of doubts during the session. *Tutorías Personalised for explanation of doubts in the contents given.

Assessment					
Description		Qualification Training and Learning Results			
Essay questions exam	Proof written, theory and problems	80	B3 B4	C13 C20	D3 D6 D10 D16 D17 D20
Practices report	Assistance with *aprovechamiento to the practices and preparation of reports of the practices made and realisation of the relative proofs to the practical session (laboratory or classroom of computing)	20	B3 B4	C13 C20	D3 D6 D10 D16 D17 D20

Other comments on the Evaluation

The matter will approve obtains an equal qualification or elder that a 5 how final note, obtained of the following form:- by the assistance with *aprovechamiento to &the "Practices in classrooms of computer/laboratory";, the preparation of reports/memory of practice and resolution of the exercises proposed (continuous evaluation of 20%).- By the realisation of "Proofs of long answer, of development" in the planned dates in January (first edition) and June (second edition) as it establish the school (final examination of 80%).Only the students that renounce to the continuous evaluation in the terms established will have right the realisation of a proof of exercises (equivalent to the continuous evaluation of 20%) in the same date of the examination.Will employ a system of numerical qualification of 0 to 10 points second the legislation collected in the *RD 1125/2003 of 5 of September, BOE of 18 September* ethical Commitment: it expects that the present student a suitable ethical behaviour. In the case to detect a no ethical behaviour (copy, plagiarism, utilisation of unauthorised electronic devices, and others) will consider that the student does not gather the necessary requirements to surpass the matter. In this case the global qualification in the present academic course will be of suspense (0.0).

Sources of information

Basic Bibliography

Casqueiro, Carlos, **Apuntes de teoría de Automoviles**, 2011

Pablo Luque, **Ingeniería del automóvil : sistemas y comportamiento dinámico**, Thomson, 2004

Manuel Arias-Paz, **Manual de Automóviles**, Dossat, 2001

Complementary Bibliography

Cascajosa Soriano, Manuel, **Ingeniería de vehículos : sistemas y cálculos**, Tébar, 2007

José Font Mezquita, **Tratado sobre automóviles**, UPV, 2006

Recommendations

Subjects that it is recommended to have taken before

Mechanism and machine theory/V12G380V01306

Machine design I/V12G380V01304