



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			
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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
Practices through ICT	12	12	24
Essay questions exam	3	0	3
Essay	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
Practices through ICT	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
Practices through ICT	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	60	B3 B4	C13 C20	D3 D6 D10 D16 D17 D20
Essay	The work contemplates so much the parts of autonomous work, individual or *grupal, like relative proofs to the development of said works, in concrete: - 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) - Realisation of activities and descriptive visual questionnaires, and delivery and review of the same	40	B3 B4	C13 C20	D3 D6 D10 D16 D17 D20

Other comments on the Evaluation

- The qualification of the continuous evaluation will have a weight of 40% (4 points on 10) in the final note of the matter, and divides in two parts:

By a part, the realisation of the activities and practical □*P□, including deliver/test associated, corresponds to 15% (5+5+5) of the final qualification (1,5 points on 10), including the participation in the activities published in *Faitic previously and for the session, and deliver them/test requested. To be able to consider the part *P in the final qualification, owe to make all the activities described.

On the other hand, the realisation of questionnaires □*Q□ descriptive, according to the instructions given, including the participation in the activities published in *Faitic on the systems of vehicles cars, and, likewise, the realisation and review of the remaining questionnaires □*Q□ posed by the other groups, corresponds to 25% (5+5+15) of the final qualification (2,5 points on 10). Inside this percentage includes the realisation of an individual proof of continuous evaluation on said questionnaires *Q, to make the same day that the final examination. The questions will not be necessarily of type test, but also can be of short answer, and no necessarily equal to the developed previously, but of the same typology. To be able to consider the part *Q in the final qualification, have to make all the activities described, included the individual proof of corresponding continuous evaluation.

- The students with RENUNCIATION to continuous qualification, HAS TO CONTACT WITH THE *PROFESORADO to indicate that it wishes to make a proof that *supla the no realisation of the activities □*P□ and □*Q□, of such way that said part can him describe with a specific proof that will take place in the same date that the final examination. This specific proof will cover the relative contents to the activities and practical □*P□ and his deliveries/test associated and to the questionnaires □*Q□ descriptive (on a total of 4 points: 1,5+2,5 points).

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- The qualification of the final examination will have a corresponding weight to the remaining 60% (6 points on 10) in the final note of the matter, and will be able to have diverse typologies of activities of evaluation:

corresponding Activities to the part of CALCULATION, that will be roughly 75%-85% of the examination (4-5 points on 6, roughly), and corresponding activities to the DESCRIPTIVE part, that will be roughly the remaining 15%-25% of the examination (1-2 points on 6, roughly).

To consider said correct activities, the calculations made will have to be clearly justified and will require accuracy in the solution and coherence in the approach. Likewise, the activities will be exercises and/or questions, and these last will not be necessarily of type test, but also can be of brief explanation or short answer.

The part of CALCULATION covers all the relative contents to the vehicle and his behaviour. The DESCRIPTIVE part covers not only the contents of systems of vehicles cars (*T1 to *T4) but also the corresponding contents to the subjects *T5 of security, homologation-inspection-reforms, infrastructures, and *T6 of rail and material vehicles *rodante.

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In the final examination demands a minimum punctuation of 2,5 points on 6 so that it can take into account the part of qualification of the continuous evaluation. In case of not to reach said value, the final qualification will be the corresponding only to the examination, without considering the part of continuous evaluation, that will conserve for the second edition.

In the case to reach said minimum punctuation in the examination, the final qualification will be the sum of the qualification of the examination (on 6 points) and the qualification of the two parts, [*P] and [*Q], of the continuous evaluation (on 4 points), being necessary to reach a 5,0 to surpass the matter.

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Will employ a system of numerical qualification of 0 to 10 points with a decimal.

* Ethical commitment: it expects that the present student a suitable ethical behaviour (is connoisseur of said commitment, so much of the School, as of the published by the University). In the case to detect a no ethical behaviour (copy, plagiarism, utilisation of means, included electronic devices, unauthorised, 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

Recommendations

Subjects that it is recommended to have taken before

Mechanism and machine theory/V12G380V01306

Machine design I/V12G380V01304

Contingency plan

Description

The teaching methodologies will impart , to be necessary, *adecuándoas to the telematic means that put the disposal of the teaching staff, in addition to the documentation facilitated by FAITI*C and other platforms, email, etc.

In the measure of the possible, will prevail the *impartición of the contained theorists by telematic means as well as those contents of practices of problems, classroom of computing, and others, that was possible to be *virtualizados, or imparted in classrooms wider to fulfil with the rule of occupation and *distnaciamento in force, tried *mater to *presencialidade stop the practical *experimentáis of laboratory, with reduced groups. In the case of no power be imparted of form *presencial, those contents in the *virtualizables will impart or *suplirán by others (autonomous work *guído, etc.) Enabling achieve equally to the *competençais associated it they.

The *titorías will develop indistinctly of form *presencial (always that it was possible and guarantee the sanitary measures) and telematic (*email and others) *respetando the schedules of *titorias due. *Asemade, it will do a *adecuación methodological to the students of risk, *facilitándlle additional specific information, to accredit that can not have access to the contained imparted of conventional form.

Additional information envelope to evaluation: *manteñense those proofs that already come realizing of telematic form and, in the measure of the possible, will keep the proofs *presenciais *adecuándoas the normative *santaria valid. The proofs will develop of form *presencial except Resolution *Reitoral that indicate that they owe do of form no *presencial, realizing gave way through the distinct tools put the disposal of the teaching staff. Those proofs no *realizables of telematic form *suplirán by others (deliveries of autonomous work *guído, etc.)

- Indicate, in this *ultimo case, to be *necesraio, the new weights of the evaluation. If no they change the weights of evaluation, indicated:

they Keep the criterion of evaluation *adecuando the realization of the proofs, in the case to be necessary and by indication in Resolution *Reitoral, to the telematic means places to disposal of the teaching staff
