



## Teaching Guide

Identifying Data					2016/17
Subject (*)	Física 2	Code	630G01013		
Study programme	Grao en Arquitectura				
Descriptors					
Cycle	Period	Year	Type	Credits	
Graduate	1st four-month period	Second	FB	6	
Language	SpanishEnglish				
Teaching method	Face-to-face				
Prerequisites					
Department	Tecnoloxía da Construción				
Coordinador	Sabin Díaz, Patricia	E-mail	patricia.sabin@udc.es		
Lecturers	Sabin Diaz, Patricia	E-mail	patricia.sabin@udc.es		
Web					
General description	<p>The subject is divided into theoretical or lectures and practical part. The practical part is taught in small group. Teaching students on mobility programs will accommodate pedagogical conditions and special guardianship papers, as well as testing and assessment tests.</p> <p>In the lectures, the descriptive work of the teacher is dominant. The students have to participate in the development of this lectures in an active way. This work will be completed with the resolution of different exercises on topics suggested by the teacher during practical classes program.</p> <p>For the efficient use and improvement of the subject is essential:</p> <p>A) ATTENDANCE: The ongoing monitoring of both lectures and practices; so that in order to pass the course, you will need achieve a minimum of 80% of total aid.</p> <p>B) WORK SUPERVISED (maximum 2 points): They are divided into two sections</p> <p>AUTO EXERCISES: You will need to raise and resolve student individually at least 3 years of each of the items described in the section of the subject content. Delivery format is at the discretion of each teacher.</p> <p>TESTS: individualized and raised by the teacher throughout the school year without notice. These can be both theoretical and practical.</p> <p>To apply to the FINAL EXAM it is necessary obtain at least a 1 in this section.</p> <p>C) FINAL EXAM (Maximum 8 points): to be held at a date determined by the governing bodies of the ETSAC. This examination will consist of a multiple choice test [2 points.] And an objective test [6 points.], Taking his realization about four hours.</p> <p>Simultaneous compliance with paragraphs A) and B) allow the student to review the filing and obtaining a supplementary note to the final exam. In the July session may submit all students enrolled in the subject matter or may not have exceeded attendance controls. The approval is set in five out of ten possible according to the following breakdown: multiple choice test: 2points, objective test: 6points, supervised work: 2points.</p>				

## Study programme competences / results

Code	Study programme competences / results
A12	PROXECTO DE ACONDICIONAMENTO AMBIENTAL: aptitude ou capacidade para concibir, deseñar, calcular, integrar en edificios e conxuntos urbanos e executar solucións de acondicionamento ambiental, incluíndo o illamento térmico e acústico, o control climático, o rendemento enerxético e a iluminación natural, así como para asesorar tecnicamente sobre estes aspectos.
A23	PROXECTO DE INSTALACIÓNS HIDRAÚLICAS: aptitude ou capacidade para concibir, deseñar, calcular, integrar en edificios e conxuntos urbanos e executar instalacións de subministro, tratamento e evacuación de augas, así como para asesorar tecnicamente sobre estes aspectos.
A24	PROXECTO DE INSTALACIÓNS ELÉCTRICAS E ASOCIADAS: aptitude ou capacidade para concibir, deseñar, calcular, integrar en edificios e conxuntos urbanos e executar instalacións de transformación e subministro de electricidade, de comunicación audiovisual e de iluminación artificial, así como para asesorar tecnicamente sobre estes aspectos.



A27	PROXECTO DE OBRA GROSA: aptitude ou capacidade para dimensionar, deseñar, programar e poñer en obra e integrar en edificios e conxuntos urbanos as solucións construtivas, encontros e remates dos sistemas de obra grosa, pechamento, cuberta, e en detalle, e tamén para asesorar tecnicamente sobre estes aspectos.
A47	ECOLOXÍA E SOSTENIBILIDADE: comprensión ou coñecemento da responsabilidade do arquitecto respecto aos principios básicos de ecoloxía, de sustentabilidade e de conservación dos recursos e do medio ambiente na edificación, o urbanismo e a paisaxe.
A49	CIENCIAS DO MEDIO FÍSICO: comprensión ou coñecemento das bases de climatoloxía, xeomorfoloxía, xeoloxía, hidroloxía e edafoloxía precisas para abordar os estudos territoriais, urbanísticos e paisaxísticos.
A54	BASES DE FÍSICA AMBIENTAL: comprensión ou coñecemento dos principios de termodinámica, acústica e óptica necesarios para proporcionar aos edificios e espazos urbanos condicións pasivas de habitabilidade, illamento e protección.
A55	BASES DE FÍSICA DE FLUXOS: comprensión ou coñecemento dos principios de mecánica de fluídos, hidráulica, electricidade, electromagnetismo e luminotecnia necesarios para dotar os edificios e conxuntos urbanos de equipamento activo para o confort e a educación ambiental.
B1	Learn how to learn
B2	Resolver problemas de forma efectiva.
B3	Aplicar un pensamento crítico, lóxico e creativo.
B4	Traballar de forma autónoma con iniciativa.
B5	Traballar de forma colaborativa.
B6	Comportarse con ética e responsabilidade social como cidadán e como profesional.
B7	Comunicarse de maneira efectiva nun entorno de traballo.
B8	Visión espacial.
B9	Creatividade.
B10	Sensibilidade estética.
B11	Capacidade de análise e síntese.
B12	Toma de decisións.
B13	Imaxinación.
B18	Razoamento crítico.
B20	Sensibilidade cara a temas medioambientais.
B21	Intuición mecánica.
B28	Comprensión numérica.
B29	Adaptación a novas situacións.
C1	Expresarse correctamente, tanto de forma oral coma escrita, nas linguas oficiais da comunidade autónoma.
C2	Dominar a expresión e a comprensión de forma oral e escrita dun idioma estranxeiro.
C3	Utilizar as ferramentas básicas das tecnoloxías da información e as comunicacións (TIC) necesarias para o exercicio da súa profesión e para a aprendizaxe ao longo da súa vida.
C4	Desenvolverse para o exercicio dunha cidadanía aberta, culta, crítica, comprometida, democrática e solidaria, capaz de analizar a realidade, diagnosticar problemas, formular e implantar solucións baseadas no coñecemento e orientadas ao ben común.
C6	Valorar criticamente o coñecemento, a tecnoloxía e a información dispoñible para resolver os problemas cos que deben enfrontarse.
C7	Asumir como profesional e cidadán a importancia da aprendizaxe ao longo da vida.
C8	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 /  
results



FLUID MECHANICS AND HYDRAULIC	A23	B1	C1
	A47	B2	C2
	A49	B3	C3
	A55	B4	C6
		B6	C7
		B8	
		B9	
		B11	
		B13	
		B18	
		B20	
		B21	
		B28	
B29			
HEAT TRANSFER IN REAL WALLS	A12	B1	
	A23	B2	
	A24	B3	
	A47	B4	
	A49	B6	
	A54	B11	
	A55	B20	
		B28	
B29			
ACOUSTIC	A12	B1	C3
	A47	B2	C4
	A54	B3	C6
		B4	C7
		B5	C8
		B6	
		B7	
		B10	
		B11	
		B12	
		B20	
		B28	
B29			
ELECTRICITY	A12	B1	C3
	A24	B2	C4
	A27	B3	C7
	A47	B4	C8
	A55	B5	
		B6	
		B7	
		B11	
		B12	
		B28	
B29			



THEORY OF LIGHT AND COLOR	A12	B1	C3
	A47	B2	C4
	A55	B3	C7
		B4	C8
		B5	
		B6	
		B7	
		B10	
		B12	
		B20	
		B28	
		B29	

Contents	
Topic	Sub-topic



FLUID MECHANICS AND HYDRAULIC	INTRODUCTION HISTORY PROPERTIES OF FLUIDS HYDROSTATIC INTRODUCTION. PRESSURE AT A POINT BASIC PRINCIPLES FUNDAMENTAL EQUATION SUBMERGED SURFACE PRESSURES HYDROSTATIC THRUST PRESSURE CENTER PRISMA PRESSURE FUNDAMENTALS OF FLUID FLOW INTRODUCTION. RANKINGS FLOW LINES, POWER WIRES AND TUBES FLOW. DIMENSIONAL EQUATION. UNITS ENERGY IN A MOVING FLUID BERNOULLI THEOREM IDEAL FLUID REAL FLUID HYDRAULIC POWER FLUID FLOW MEASUREMENT FLUID FLOW IN PIPES INTRODUCTION. LAMINAR AND TURBULENT FLOWS DISTRIBUTION OF SPEED. BOUNDARY LAYER ADIMENSIONASL NUMBERS. REYNOLDS NUMBER SURFACE RESISTANCE. PRIMARY LOAD LOSSES GENERAL EQUATION MOODY CHART HIGH LOAD LOSSES BRANCHED PIPING SYSTEM SERIAL, AND PARALLEL. MALLAS OPEN CHANNEL FLOW FORMULA AND MANNING CHEZY FORCES DEVELOPED BY FLUID MOTION PRINCIPLES OF MOMENTUM - MOMENTUM FORCES ON ELBOWS
HEAT TRANSFER IN REAL WALLS	COMBINED ACTION OF THREE MECHANISMS OF HEAT TRANSFER CONDITIONS OF WINTER INTRODUCTION HEAT TRANSFER THROUGH OPAQUE WALLS TEMPERATURE DISTRIBUTION IN THE SIDING HEAT TRANSFER AND VENTILATION INFILTRATIONS ARISING FROM LOCAL CONDITIONS OF SUMMER INTRODUCTION HEAT TRANSFER THROUGH OPAQUE WALLS THERMAL INERTIA SIDING HEAT TRANSFER THROUGH WALLS SEMITRSPARENT



ACOUSTIC	<p>SOUND. FUNDAMENTAL CONCEPTS.          AUDITORY PHYSIOLOGY.          PHYSICAL ASPECTS OF SOUND.          SOUND INSULATION.          SOUND DAMPING.          SOUND PACKAGING.          ENERGY SYSTEMS SOUND ABSORBENT.          SOUND ENERGY ABSORBING MATERIALS.          ARCHITECTURAL ACOUSTICS.          CTE - DB-HR</p>
ELECTRICITY	<p>INTRODUCTION          ELECTRIC CHARGE          ACT COULOMB          CONCEPT OF ELECTRIC FIELD. LINES OF FORCE          ELECTRIC POTENTIAL. ELECTRIC POTENTIAL DIFFERENCE          ELECTRICITY          OHM'S LAW          RESISTIVITY          ENERGY IN ELECTRICAL CIRCUITS. ELECTRIC POWER          CURRENT.          AC POWER. C. A. PHASE. C. A. PHASE          DISTRIBUTION NETWORKS          FEATURES. TYPES          LOW VOLTAGE ELECTRICAL INSTALLATIONS          A LOW VOLTAGE SUPPLY BUILDING          PROTECTION SYSTEMS</p>
THEORY OF LIGHT AND COLOR	<p>INTRODUCTION. HISTORY.          RADIO WAVES. FEATURES. CLASSIFICATION.          SPREAD OF LIGHT. FRESNEL-HUYGENS PRINCIPLE. REFLECTION AND REFRACTION.          PHOTOMETRIC QUANTITIES.          EFFECT PURKINJE          LIGHT FIGURES          FLOW. INTENSITY. ILUMINANCIA. ILLUMINANCE          REFLECTANCE, ABSORPTANCIA AND TRANSMISSION.          LIGHT AND VISION          THE HUMAN EYE          VISUAL PERFORMANCE FACTORS          GLARE          COLOR TEMPERATURE OF LIGHT          COLOR THEORY</p>

Planning				
Methodologies / tests	Competencies / Results	Teaching hours (in-person & virtual)	Student's personal work hours	Total hours
Introductory activities	A47 B1 B4 B5 B6 B7 B8 B9 B10 B13 B29	2	1	3
Guest lecture / keynote speech	A12 A23 A24 A27 A47 A49 A54 A55	27	40.5	67.5



Problem solving	B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 B12 B18 B20 B21 B28 C1 C2 C3 C4 C6 C7 C8	22	22	44
Objective test	B2 B3 B4 B6 B8 B11 B12 B18 B28 B29 C1 C2 C3 C6	5	0	5
Multiple-choice questions	B2 B3 B4 B6 B7 B12 B18 C1 C2 C3	1	0	1
Diagramming	A23 A24 A27 A47 A49 A54 A55 B1 B3 B4 B29	0	0.5	0.5
Glossary	B1 B3 B6 B7 B8 B9 B10 B11 B12 B13 B18	0	1	1
Supervised projects	A12 A23 A24 A27 A47 A49 A54 A55 B1 B2 B3 B4 B8 B9 B10 B11 B12 B13 B18 B28 B29	2	20	22
Workbook	A12 A23 A24 A27 A47 A49 A54 A55 B1	0	5	5
Personalized attention		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	
Methodologies	Description
Introductory activities	Presentation on the subject, explaining its operation and objectives.
Guest lecture / keynote speech	Classes in which the teacher will present on the Board or of the audiovisual content of theoretical and practical matters
Problem solving	In small group class the teacher will present a series of case studies that will solve, partially or totally, with the help and advice of Professor.
Objective test	Numerical and graphical issues on the contents of the material and the supporting literature will arise. It will assess the level of learning by the student of practical aspects of the subject
Multiple-choice questions	A multiple choice test will assess the level of learning by the student theoretical and practical aspects of the subject.
Diagramming	Brief introductions to each topic seek to relate the contents within the knowledge map of the race course in outline mode
Glossary	O alumno elabora unha folla resúmen con definicións, formulación e unidades físicas relacionadas con cada un dos temas da materia.
Supervised projects	Students handed to the teacher at least five unsolved problems of each of the topics of matter, must be made on an individual and personal, will be delivered in paper format A4 manuscript.
Workbook	The student selects and analyzes exercise and / or mechanical theory in the literature basic and further identified by teachers in this guide

Personalized attention	
Methodologies	Description



Problem solving Supervised projects	<p>Is subjected to an exhaustive control assistance and activity of the student. This is to demonstrate the autonomous work with the delivery of a series of fully solved exercises independently, must be at least 3 of each of the topics of matter, will be delivered on dates determined by the teacher in class.</p> <p>The tutorial schedule for the realization of personalized attention to the student will be exposed in the notice board of the subject.</p>
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Assessment			
Methodologies	Competencies / Results	Description	Qualification
Objective test	B2 B3 B4 B6 B8 B11 B12 B18 B28 B29 C1 C2 C3 C6	<p>Three problems or case studies based on the syllabus and bibliography arise, students give numerical answer to each of them; having even represent the results graphically. The computation of the total of the course is six points [6 points.]</p> <p>The exam is individual, non-compliance with this requirement will result in expulsion and implementing regulations. Mobile phones powered by the examination is strictly prohibited.</p> <p>During the development of theoretical questionnaire no materials of any kind will be allowed beyond pens, while for the realization of the practical part form, calculator and drawing materials will be used.</p> <p>Each exercise will be answered and will qualify in a statement DIN A3. Each exercise will be delivered independently, written in indelible ink on A4 and folded. The result is given in manner that is clearly visible, indicating the numeric value with precision and corresponding units. Invalid parties must be clearly void. The solution sheets and sheet title will be written the name of the student and his group to be edited</p>	60
Multiple-choice questions	B2 B3 B4 B6 B7 B12 B18 C1 C2 C3	<p>Accuracy in answering ten questions about theoretical and practical aspects with four options, of which unless one is correct is desirable. The conditions of wrong answers will be expressed in the exercise . A minimum of 5 points is established in this test to pass the course. His calculation of the total valuation of the course is two points [2points.] No materials will be allowed of any kind, beyond pens.</p>	20
Supervised projects	A12 A23 A24 A27 A47 A49 A54 A55 B1 B2 B3 B4 B8 B9 B10 B11 B12 B13 B18 B28 B29	<p>The student will need to raise and resolve individually and customized exercises at least 3 of the items described in the section of the subject content, the teacher will establish in a timely manner throughout the course along with their deadline .</p> <p>The student will need to exceed individualized testing and control raised by the teacher as long academic year, without notice of the completion thereof. These tests may be both theoretical and practical.</p> <p>It is necessary to get at least 1 point to take examinations.</p>	20

Assessment comments
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The marking criteria are adapted to the reality of professional derivatives. As a general rule misconceptions are valued according to their severity, and may nullify the exercise. Also relevant to the commission of a numerical error, since the practice seeks concrete results. In this regard it is noted that a mistake of sign means an error of 200%.

For a favorable assessment the student must complete the different parts and attendance to introduce themselves, to a minimum of 80% of the total. The marking criteria are adapted to the reality of professional derivatives. As a general rule misconceptions are valued according to their severity, and may nullify the exercise. Also relevant to the commission of a numerical error, since the practice seeks concrete results. In this regard it is noted that a mistake of sign means an error of 200%. The approved notices a note five out of ten possible. The publication of the notes will be made within the established time limits. The list of notes contain the date and time of the exam review to be held within the time limits set out in the Academic Regulations Assessments, Ratings and Complaints. In the July session may submit all students enrolled in the subject. The approval is set in five out of ten possible according to the following breakdown: multiple choice

test: 2 points

objective test: 6 points supervised works: 2 points

### Sources of information

<b>Basic</b>	<ul style="list-style-type: none"> <li>- Mataix, C (1970). Mecánica de fluidos y máquinas hidráulicas. Madrid. Editorial Harla</li> <li>- Varios (2008). Fundamentos Físicos de la Arquitectura I. Departamento de Tecnología de la Construcción. ETSAC</li> <li>- Freire Tellado, M. &amp; Muñoz Vidal, M (2007). Introducción a las condiciones Térmicas en Edificación . Departamento de Tecnología de la Construcción . UDC</li> <li>- Varios (). Código Técnico de la Edificación . Ministerio de Vivienda</li> <li>- Josse, R (). La acústica en la construcción. Editorial Gustavo Gili.</li> <li>- Guerrero, A (). Instalaciones eléctricas en las edificaciones. Editorial McGraw-Hill</li> <li>- Ramírez Vázquez, J (). Luminotecnia. Editorial Ceac</li> </ul>
<b>Complementary</b>	<ul style="list-style-type: none"> <li>- Agüera Soriano (). Mecánica de fluidos. Editorial Ciencia y Distribución</li> <li>- Giles, R. V (1982). Mecánica de fluidos e hidráulica. Editorial McGraw-Hill. Mexico</li> <li>- López Hernández, E &amp; Muñoz Vidal, M (1994). Introducción a las instalaciones de edificación. Departamento de Tecnología de la Construcción. A Coruña</li> <li>- Bueche, F. J (). Física para estudiantes de ciencias e ingeniería. Editorial McGraw-Hill.</li> <li>- Manuel Margarida (). Aislamiento térmico. Editorial Etasa.</li> <li>- Linares, J. &amp; Lloppis Regna (). Fundamentos de acústica. Universidad Politécnica de Valencia</li> <li>- Augé, R. (). Curso de electricidad general. Editorial Paraninfo</li> </ul>

### Recommendations

#### Subjects that it is recommended to have taken before

Physics 1/630G01008

#### Subjects that are recommended to be taken simultaneously

Proyectos 3/630G01011

Análise Arquitectónico 1/630G01012

Xeometría da Forma Arquitectónica/630G01014

Historia da Arte/630G01015

#### Subjects that continue the syllabus

Estruturas 1/630G01019

#### Other comments

For proper monitoring of the subject is necessary prior mastery of the following topics by the students: - Logical Reasoning. - Unit systems. - Geometry and Trigonometry. - Derivation and integration. - Solving systems of equations. - Introduction to building materials.

(\*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.