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 Diaz, Patricia		E-mail	patricia.sabin@udc.es	
Lecturers	Sabin Diaz, Patricia		E-mail	patricia.sabin@udc.es	
Web					
General description	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. 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. For the efficient use and improvement of the subject is essential: 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. B) WORK SUPERVISED (maximum 2 points): They are divided into two sections 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. TESTS: individualized and raised by the teacher throughout the school year without notice. These can be both theoretical and practical. To apply to the FINAL EXAM it is necessary obtain at least a 1 in this section. 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. 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.				

Study programme competences	
Code	Study programme competences
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 sostenibilidade 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, hidraúlica, 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

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

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

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 SEMITRANSPARENT

ACOUSTIC	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
ELECTRICITY	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
THEORY OF LIGHT AND COLOR	INTRODUCTION. HISTORY. RADIO WAVES. FEATURES. CLASSIFICATION. SPREAD OF LIGHT. FRESNEL-HUYGENS PRINCIPLE. REFLECTION AND REFRACTION. PHOTOMETRIC QUANTITIES. EFFECT PURKINJE LIGHT FIGURES FLOW. INTENSITY. ILUMINNACIA. ILLUMINANCE REFLECTANCE, ABSOTANCIA AND TRANSMISSION. LIGHT AND VISION THE HUMAN EYE VISUAL PERFORMANCE FACTORS GLARE COLOR TEMPERATURE OF LIGHT COLOR THEORY

Planning				
Methodologies / tests	Competencies	Ordinary class hours	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 resumen 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	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. The tutorial schedule for the realization of personalized attention to the student will be exposed in the notice board of the subject.

Assessment			
Methodologies	**Competencies**	**Description**	**Qualification**
Objective test	B2 B3 B4 B6 B8 B11 B12 B18 B28 B29 C1 C2 C3 C6	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.] 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. 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. 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	60
Multiple-choice questions	B2 B3 B4 B6 B7 B12 B18 C1 C2 C3	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.	20
Supervised projects	A12 A23 A24 A27 A47 A49 A54 A55 B1 B2 B3 B4 B8 B9 B10 B11 B12 B13 B18 B28 B29	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 . 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. It is necessary to get at least 1 point to take examinations.	20

Assessment comments

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

For afavorable assessment the student must complete the different parts andattendance to introduce themselves, to a minimum of 80% of the total.The marking criteria are adapted to the reality of professional derivatives. Asa general rule misconceptions are valued according to their severity, and maynullify the exercise. Also relevant to the commission of a numerical error,since the practice seeks concrete results. In this regard it is noted that amistake of sign means an error of 200%.The approved notices a note five out of ten possible. The publication of thenotes will be made within the established time limits. The list of notescontain the date and time of the exam review to be held within the time limitsset 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 often possible according to the following breakdown:multiple choice

test:2points

objectivetest: 6 pointssupervised works: 2 points

Sources of information	
Basic	- Mataix, C (1970). Mecánica de fluidos y máquinas hidráulicas. Madrid. Editorial Harla - Varios (2008). Fundamentos Físicos de la Arquitectura I. Departamento de Tecnología de la Construcción. ETSAC - Freire Tellado, M. & Muñoz Vidal, M (2007). Introducción a las condiciones Térmicas en Edificación . Departamento de Tecnología de la Construcción . UDC - Varios (). Codigo Tecnico de la Edificicación . Ministerio de Vivienda - Josse, R (). La acústica en la construcción. Editorial Gustavo Gili. - Guerrero, A (). Instalaciones eléctricas en las edificaciones. Editorial McGraw-Hill - Ramírez Vázquez, J (). Luminotecnia. Editorial Ceac
Complementary	- Agüera Soriano (). Mecánica de fluidos. Editorial Ciencia y Distribución - Giles, R. V (1982). Mecánica de fluidos e hidráulica. Editorial McGraw-Hill. Mexico - López Hernández, E & Muñoz Vidal, M (1994). Introducción a las instalaciones de edificación. Departamento de Tecnología de la Construcción. A Coruña - Bueche, F. J (). Física para estudiantes de ciencias e ingeniería. Editorial McGraw-Hill. - Manuel Margarida (). Aislameinto térmico. Editorial Etasa. - Llinares, J. & Lloppis Regna (). Fundamentos de acústica. Universidad Politécnica de Valencia - Augé, R. (). Curso de electricidad general. Editorial Paraninfo

Recommendations
Subjects that it is recommended to have taken before
Physics 1/630G01008
Subjects that are recommended to be taken simultaneously
Proxectos 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.