Teaching Guide				
Identifying Data				2016/17
Subject (*)	Física para a Arquitectura 2		Code	630G02013
Study programme	Grao en Estudos de Arquitectura			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	1st four-month period	Second	Obligatoria	6
Language	SpanishEnglish			
Teaching method	Face-to-face			
Prerequisites				
Department	Tecnoloxía da Construción			
Coordinador	Sabin Diaz, Patricia	E-mail	patricia.sabin@udc.es	
Lecturers	Cuba Cabana, Hilda Dominguez Diez, Javier Faustino Lamas Lopez, Valentin López César, Isaac Sabin Diaz, Patricia	E-mail	hilda.cuba@udc.es javier.dominguez@udc.es valentin.lamas@udc.es isaac.lopez@udc.es 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 / results	
Code	Study programme competences / results
A8	"Knowledge of the principles of thermodynamics, acoustics and optics adapted and applied to architecture and urbanism "
A9	"Knowledge of of the principles of fluid mechanics, hydraulics, electricity and electromagnetism adapted and applied to architecture and urbanism "
A63	Development, presentation and public review before a university jury of an original academic work individually elaborated and linked to any of the subjects previously studied

B1	Students have demonstrated knowledge and understanding in a field of study that is based on the general secondary education, and is usually at a level which, although it is supported by advanced textbooks, includes some aspects that imply knowledge of the forefront of their field of study
B2	Students can apply their knowledge to their work or vocation in a professional way and have competences that can be displayed by means of elaborating and sustaining arguments and solving problems in their field of study
B3	Students have the ability to gather and interpret relevant data (usually within their field of study) to inform judgements that include reflection on relevant social, scientific or ethical issues
B4	Students can communicate information, ideas, problems and solutions to both specialist and non-specialist public
B5	Students have developed those learning skills necessary to undertake further studies with a high level of autonomy
B6	Knowing the history and theories of architecture and the arts, technologies and human sciences related to architecture
B10	Knowing the physical problems, various technologies and function of buildings so as to provide them with internal conditions of comfort and protection against the climate factors in the context of sustainable development
C1	Expressing themselves correctly, both orally and in writing, in the official languages of the autonomous region
C3	Using basic tools of information technology and communications (ICT) necessary for the exercise of the profession and for lifelong learning
C5	Understanding the importance of entrepreneurship and knowing the means available to the enterpreneur
C6	Critically evaluate the knowledge, technology and information available to solve the problems they must face
C7	Assuming as professionals and citizens the importance of learning throughout life
C8	Assessing the importance of research, innovation and technological development in the socio-economic advance of society and culture

Learning outcomes			
Learning outcomes	Study programme competences / results		
FLUID MECHANICS AND HYDRAULIC	A8 A9 A63	B1 B2 B3 B4 B5 B6 B10	C1 C3 C5 C6 C7 C8
HEAT TRANSFER IN REAL WALLS	A12 A49 A54	B1 B2 B3 B4 B5 B6 B7 B10 B11 B12 B20 B28 B29	C3 C4 C6 C7 C8

ACOUSTIC	A8 A9 A63	B1 B2 B3 B4 B5 B6 B10	C1 C3 C5 C6 C7 C8
ELECTRICITY	A8 A9 A63	B1 B2 B3 B4 B5 B6 B10	C1 C3 C5 C6 C7 C8
THEORY OF LIGHT AND COLOR	A8 A9 A63	B1 B2 B3 B4 B5 B6 B10	C1 C3 C5 C6 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 / Results	Teaching hours (in-person & virtual)	Student?s personal work hours	Total hours
Introductory activities	A8 A9 A63 B1 B4 B5 B6 B7 B10 B29 B1 B2 B3 B4 B5 B6 B10 C1 C3 C5 C6 C7 C8	2	1	3
Guest lecture / keynote speech	A12 A49 A54	27	40.5	67.5

Problem solving	B2 B3 B4 B5 B6 B7 B10 B11 B12 B20 B28 C3 C4 C6 C7 C8	22	22	44
Objective test	B2 B3 B4 B6 B11 B12 B28 B29 C3 C6	5	0	5
Multiple-choice questions	B2 B3 B4 B6 B7 B12 C3	1	0	1
Diagramming	A49 A54 B1 B3 B4 B29	0	0.5	0.5
Glossary	B1 B3 B6 B7 B10 B11 B12	0	1	1
Supervised projects	A12 A49 A54 B1 B2 B3 B4 B10 B11 B12 B28 B29	2	20	22
Workbook	A12 A49 A54 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. Serve, along with meeting attendance requirements, have access to additional grade for the course.
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**
Supervised projects Problem solving	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 / Results	Description	Qualification
Supervised projects	A12 A49 A54 B1 B2 B3 B4 B10 B11 B12 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
Multiple-choice questions	B2 B3 B4 B6 B7 B12 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
Objective test	B2 B3 B4 B6 B11 B12 B28 B29 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

Assessment comments
For a favorable assessment the student mustcomplete the different parts and attendance to introduce themselves, to aminimum 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%. 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 even whenthey have not exceeded attendance controls. 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	- Augé, R. (). Curso de electricidad general. Editorial Paraninfo - 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

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.