Teaching Guide				
Identifying Data				2021/22
Subject (*)	Descriptive Geometry		Code	630G02003
Study programme	Grao en Estudos de Arquitectura			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	1st four-month period	First	Basic training	6
Language	English			
Teaching method	Face-to-face			
Prerequisites				
Department	Expresión Gráfica Arquitectónica			
Coordinador	Tarrio Carrodeguas, Santiago	E-mail	santiago.tarrio@udc.es	
Lecturers	Perez Naya, Antonia Maria	E-mail	antonia.perez.naya@udc.es	
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Web				
General description	Descriptive Geometry is considered the support of graphic language, enabling the use of drawing as expression and representation of architectural space. Supplying geometric rigour to the representation and analysis of architecture and developing the ability to imagine and read spatially.			
Contingency plan	1. Modifications to the contents: No changes are considered 2. Methodologies *Teaching methodologies that are maintained -Guest lecture -Workshop -Student´s portfolio -Collaborative learning -Practical test *Teaching methodologies that are modified 3. Mechanisms for personalized attention to students - Email: questions and booking of virtual or physical tutorials. - Moodle: theory and practical contents will be uploaded and shared in this UDC platform. -Teams: a weekly session for the big group developing theory contents and checking practical tasks. -Tutorial time will be used for small goups or individuals and the main goal will be supervising student´s work. 4. Modifications in the evaluation No changes are considered *Evaluation observations: 5. Modifications to the bibliography or webgraphy: No changes are considered			

Study programme competences / results	
Code	Study programme competences / results
A1	"Ability to apply graphical procedures to the representation of spaces and objects (T) "
A2	Ability to conceive and represent the visual attributes of objects and master proportion and drawing techniques, including digital ones (T)

A3	Knowledge of spatial representation systems and projections adapted and applied to architecture
A4	Knowledge of the analysis and the theory of form and the laws of visual perception adapted and applied to architecture and urbanism
A5	"Knowledge of the metric and projective geometry adapted and applied to architecture and urbanism "
A6	"Knowledge of graphic surveying techniques at all stages, from the drawing sketches to scientific restitution, adapted and applied to architecture and urbanism "
A10	"Knowledge of basic topography, hypsometry, mapping and earthmoving techniques 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
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
B12	Understanding the relationship between people and buildings and between these and their environment, and the need to relate buildings and the spaces between them according to the needs and human scale
C1	Adequate oral and written expression in the official languages.
C2	Mastering oral and written expression in a foreign language.
C3	Using ICT in working contexts and lifelong learning.
C4	Exercising an open, educated, critical, committed, democratic and caring citizenship, being able to analyse facts, diagnose problems, formulate and implement solutions based on knowledge and solutions for the common good
C5	Understanding the importance of entrepreneurial culture and the useful means for enterprising people.
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	Valuing the importance of research, innovation and technological development for the socioeconomic and cultural progress of society.

Learning outcomes			
Learning outcomes	Study programme competences / results		
Capacity development of imagination and spatial reading for both the student can imagine in space an object represented in the plane, and vice versa, i.e. stimulate spatial apprehension or "see in space"	A1 A3 A4 A5 A6 A10 A63	B1 B4 B5 B12	C2
Supply geometric rigour to the representation and analysis of architectural space, without forgetting that the architect's creative process is fundamentally based on rational capacity of space perception	A1 A2 A3 A5 A10	B1 B4 B5 B12	C3
Study of different systems of representation, i.e. projections, and the implementation in the architectural field, from its theoretical foundations, with a deepening differentiated according to its efficiency, based on the selection of the most suitable system for each specific case.	A3 A5 A10 A63	B4 B5	C3 C6 C7

Development of expressiveness through intentional projections, perspectives and shadows, useful in other areas of architectural training.	A2 A3 A4 A5 A6 A63	B4	C3 C6
Introduce students to the knowledge of architectural examples of interest that will contribute to their architectural culture, making them see that their goal is the architecture and not the drawing itself.	A1 A2 A3 A4 A5 A6 A10	B1 B5 B12	C1 C4 C5 C8
Introduce students to the representation of architecture through digital processes, specifically the use of 3D CAD software.	A1 A2 A3 A4 A5 A63		C3

Contents	
Topic	**Sub-topic**
I.- MULTIVIEW ORTHOGRAPHIC PROJECTION. LESSON 1.- DESCRIPTIVE GEOMETRY. OVERVIEW	1.1 -. Objectives of Descriptive Geometry. 1.2 -. Concept of projection. Classification and properties. 1.3 -. Concept of biunivocity. Projections. Classification. 1.4 -. Geometric elements in space. Denomination.
LESSON 2.- MULTIVIEW ORTHOGRAPHIC PROJECTION. OVERVIEW	2.1 -. Concept. 2.2 -. European projection. American projection. 2.3 -. Primary auxiliary views. - Plans, elevations and sections.
LESSON 3.- SECONDARY AUXILIARY VIEWS	3.1.- View projected from the top view. 3.2.- View projected from the front view. 3.3.- Succesive auxiliary views
LESSON 4.- FUNDAMENTAL GEOMETRIC ELEMENTS	4.1.- Representation of straigth lines and planes. -Different positions. 4.2.- Main plane straight lines. -Horizontal line. -Maximum slope line. 4.3.- Relationships between line and plane: intersection and parallelism. 4.4.- Relationships between two planes: intersection and parallelism.
LESSON 5. - TRUE SIZE AND PLANE FIGURES	5.1.- True size and shape: - Auxiliary plans. - Rotation and revolution. - Combined method. 5.2.- Representation of plane figures
II.- AXONOMETRIC PROJECTION AND TOPOGRAPHIC PROJECTION. LESSON 6.- AXONOMETRIC PROJECTION. OVERVIEW	6.1.- Concept. 6.2.- Orthographic axonometric. 6.3.- Oblique axonometric. 6.4.- Main axonometric projections.

LESSON 7.- TOPOGRAPHIC PROJECTION. TERRAIN REPRESENTATION	7.1.- Concept. 7.2.- Topographic surfaces. Contour lines. 7.3.- Profiles and panoramas. 7.4.- Analysis and interpretation of topographic surfaces.
LESSON 8. - TOPOGRAPHIC PROJECTION. ROOF DESIGN	8.1.- Concept. 8.2.- Planes with the same slopes. 8.3.- Planes with different slopes.
III.- LINEAR PERSPECTIVE. LESSON 9.- LINEAR PERSPECTIVE. OVERVIEW	9.1.- Concept. 9.2.- Representation of a straight line. 9.3.- Representation of the plane. 9.4.- Types of linear perspectives. - According to the picture plane. - According to the station point.
LESSON 10. - CLASSIC METHODS OF PERSPECTIVE. VISUAL RAY METHOD	10.1.- One-point perspective. 10.2.- Two-point perspective. 10.3.- Visual perception and representation. Distortion diagrams. 10.4.- Relative position of the elements in linear perspective. - Influence of the location of the station point. - Influence of the location of the picture plane.
LESSON 11.- DIRECT MEASUREMENT IN PERSPECTIVE. MEASURING POINT METHOD	11.1.- Concept. 11.2.- One-point perspective. 11.3.- Two-point perspective.
IV.- INTRODUCTION TO SHADES AND SHADOWS. LESSON 12. - THEORY OF SHADOWS. ELEMENTS	12.1.- Solar geometry. 12.2.- Shadow of points and vertical lines. 12.3.- Shadow of other lines. 12.4.- Counter-projection. 12.5.- Shadow of curve lines.
LESSON 13.- SHADOWS IN LINEAR PERSPECTIVE	13.1.- Sunlight parallel to the picture plane. 13.2.- Sunlight oblique to the picture plane. - Sun behind the viewer. - Sun in front of the viewer.

Planning				
Methodologies / tests	**Competencies / Results**	**Teaching hours (in-person & virtual)**	**Student?s personal work hours**	**Total hours**
Introductory activities	B12 B5 C2 C5 C6 C7 C8	1	0	1
Guest lecture / keynote speech	A3 A4 A5 A6 A10	15	15	30
Workshop	A1 A2 A3 A4 A5 A6 A10 A63 B1 B4 B5 B12 C3 C4 C5 C6 C7	45	45	90
Practical test:	A1 A2 A3 A4 A5 A6 A10 B4 B5 B12 C6 C7	4	10	14
Collaborative learning	A1 A2 A3 A4 A5 A6 A10 B1 B4 B5 B12 C1 C3 C4 C5 C6 C7 C8	2	11	13
Personalized attention		2	0	2
(*)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	Activities to be carried out before starting the process of teaching and learning in order to know the skills, interests and / or motivation of the students in order to achieve the objectives. Their goal is to obtain relevant information that would allow the teaching to foster efficient and meaningful learning from the students' prior knowledge.
Guest lecture / keynote speech	This methodology has to do with the foundations of knowledge of the subject specified in the contents. In these classes, the students have a receptive aptitude following the presentations by supporting drawings on the blackboard, screen projections and digital tools (ICT). Students take notes and ask questions about the issues raised. It aims to develop the lessons, providing both concepts and the necessary tools for their understanding from a perspective in which the architecture is always present.
Workshop	This is where the student participates actively in the learning process, facing the need to assess, respond and experience all the knowledge of the lectures, to which must conform. There are two types of exercises: 1. Drawing exercises on the board with a dedication of a practice session. 2. Special exercises as a control of the student´s learning process. A theory part could be included. Architectural models of prestigious architects are selected for the development of these graphic exercises, whose formalization processes are clear and definable, in order that the students achieve an architectural culture. All exercises are mandatory and should be submitted in the workshop session, every week.
Practical test:	A final test will be done to all those students who in spite of attending the course did not pass the subject. It may consist of theoretical and practical contents.
Collaborative learning	Individual or group work that students must develop in CAD. Face-to-face hours will be devoted to the formulation of work, a series of lectures and the review of the works, individually or in group. This methodology referred primarily to learning the "how to do things" to promote independent learning of students, under the tutelage of a professor.

Personalized attention	
Methodologies	**Description**
Guest lecture / keynote speech Workshop Collaborative learning Introductory activities	The subject is conceived eminently experimental and practical as the student's learning process is based on the realization of graphic exercises that enable the student to participate in a more personalized relationship with the teacher. Exercises will be developed individually or in small groups and will be related to course work. In order to achieve the objectives set, tutorial attendance is considered essential.

Assessment

Methodologies	Competencies / Results	Description	Qualification
Workshop	A1 A2 A3 A4 A5 A6 A10 A63 B1 B4 B5 B12 C3 C4 C5 C6 C7	This is where the student participates actively in the learning process, facing the need to assess, respond and experience all the knowledge of the lectures, to which must conform. There are two types of exercises: 1. Drawing exercises on the board with a dedication of a practice session, 35%. 2. Special exercises as a control of the student´s learning process, 50%. Theory contents could be included in these special exercises. Architectural models of prestigious architects are selected for the development of these graphic exercises, whose formalization processes are clear and definable, in order that the students achieve an architectural culture. All exercises are mandatory and they should be submitted at the end of every session.	85
Practical test:	A1 A2 A3 A4 A5 A6 A10 B4 B5 B12 C6 C7	Continuous assessment is applied: -weekly drawing exercises (35%) -special exercises (50%). A minimum arithmetic mean of 5 is needed -collaborative CAD work (15%) FIRST OPPORTUNITY (JANUARY) An exam will be held for those students who do not pass the first opportunity in spite of taking part in the course or do not have a minimum mean of 5 in the special exercises. In this case the student could sit only the failed part. Theory and pracical contents could be included in the exam. All students must meet the following requirements: minimum attendance of 80% and submission of all weekly exercises and CAD work. The score of the objective test to pass the subject will be of 5/10. The final grade will take into account the objective test and the student´s work during the academic year. SECOND OPPORTUNITY (JUNE-JULY) An exam will be held for those students who do not pass the first opportunity in spite of taking part in the course. Theory and pracical contents could be included in the exam. All students must meet the following requirements: minimum attendance of 80% and submission of all weekly exercises and CAD work. The score of the objective test to pass the subject will be of 5/10. The final grade will take into account the objective test and the student´s work during the academic year to some extent.	0
Collaborative learning	A1 A2 A3 A4 A5 A6 A10 B1 B4 B5 B12 C1 C3 C4 C5 C6 C7 C8	Individual or group work that students must develop by hand, CAD and ICT. Face-to-face hours will be devoted to the formulation of work, a series of lectures and the review of the works, individually or in group.	15

Assessment comments
In order to pass the course in the 1st opportunity and / or 2nd opportunity those students who, in a justified way, can not meet 80% of attendance and deliveries of supervised practices and works, the teacher will define in a particularized way the conditions of evaluation.

Sources of information	
Basic	- FRANCO TABOADA, J. A (2011). Geometría Descriptiva para la Representación Arquitectónica. Vol. 1. Fundamentos. Santiago de Compostela: Andavira - FRANCO TABOADA, J. A (2011). Geometría Descriptiva para la Representación Arquitectónica. Vol. 2. Geometría de la Forma Arquitectónica. Santiago de Compostela: Andavira - BARTSCHI, W. (1980). El estudio de las sombras en perspectiva. Barcelona:Gustavo Gili - GHEORGHIU Y DRAGOMIR. (1978). Geometry of Structural Forms . London : Applied Science Publishers, cop. - PÉREZ NAYA, A. M.; TARRÍO CARRODEGUAS, S. B. (2015). Geometría Descriptiva y Arquitectura. Trabajos docentes a partir de obras y proyectos de David Chipperfield.. A Coruña: - SANCHEZ GALLEGO, J. A (1993). Geometría Descriptiva. Sistemas de Proyección Cilíndrica. Barcelona: Ediciones U.P.C - SCHAARWACHTER,G. (1983). Perspectiva para arquitectos. México: Gustavo Gili - VILLANUEVA BARTRINA, L. (1996). Perspectiva lineal. Su relación con la fotografía. Barcelona:Ediciones U.P.C - WAY, M., (1991). La perspectiva en el dibujo,. Barcelona: Omega
Complementary	

Recommendations
Subjects that it is recommended to have taken before
Subjects that are recommended to be taken simultaneously
Subjects that continue the syllabus
Other comments
It is considered essential for the understanding of the course that students have a good background in Technical Drawing (Secondary Education).

(*)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.