UNIVERSIDADE DA CORUÑA

Teaching Guide					
Identifying Data					2021/22
Subject (*)	Descriptive Geometry [In extinction]			Code	670G01004
Study programme	Grao en Arquitectura Técnica				
Descriptors					
Cycle	Period	Year		Type	Credits
Graduate	1st four-month period	First		Basic training	6
Language	Spanish				
Teaching method	Face-to-face				
Prerequisites					
Department	Expresión Gráfica Arquitectónica				
Coordinador	Fernández Álvarez, Ángel José		E-mail	angel.fernandez.alvarez@udc.es	
Lecturers	Fernández Álvarez, Ángel José		E-mail	angel.fernandez.alvarez@udc.es	
Web	euat.udc.es				
General description	Descriptive Geometry aims geometric rationalization of space issues. In the academic field, this is the unit that serves as a base for other specialized graphics disciplines such as Architectural Graphic Expression, Topography and Technical Projects and the use of Computer Aided Design and Computer Graphics. In the professional field, being able to read and understand construction plans is a basic skill in order to execute the work properly. This implies a knowledge of of representation methodology, whose base is the Descriptive Geometry. In the field of writing technical projects, Descriptive Geometry provides the academic training of the necessary spatial vision for the creation of the three dimensional final solution. Through plans and sketches, this course provides the theoretical foundation basics of the different representation systems. This, as well as providing students with the capability to develop their creativity and imagination, are the reasons why this course is an essential pillar in the Degree in Engineering Building. Furthermore, the contribution to professional practice is clear, in terms of representation, resolution and restitution of any space or 3D-element in the field of construction.					

Contingency plan	NON-ATTENDANCE TEACHING METHOD ACTIONS COVID-19 During the 2020/21 academic year, teaching activities will be adapted to the context defined at all times by the health crisis situation caused by COVID-19. 1. Modifications to the contents. No changes will be made. 2. Methodologies * Teaching methodologies that are maintained. Although it is a matter "in extinction" all the methodologies will be adapted to the NON-ATTENDANCE modality. * Teaching methodologies that are modified. The methodologies corresponding to PERSONALIZED ATTENTION (tutoring) and the EVALUATION procedures are modified to adapt them to NON ATTENDANCE mode. 3. Mechanisms for personalized attention to students. The personalized tutorial attention on informative or specific questions will preferably be carried out through the UDC institutional email, although the institutional telematic tools available for teamwork, such as Microsoft Teams, may also be used. All the information on the subject in this non-classroom teaching period (activities, deliveries, evaluation, tutorial attention, ...) will be done through the subject's Moodle platform (Virtual Campus), so frequent consultation is recommended. by the students. Tools: Moodle platform, UDC Email, Microsoft Teams. Temporalization: The tutoring schedule of the face-to-face teaching period would be maintained with the flexibility marked by the exceptional nature of the situation caused by the health crisis of COVID-19. Personalized attention will be carried out using the telematic tool that is considered most appropriate depending on the case. 4. Modifications under evaluation Methodology: Graphic practices. Rating weight: 40%. Solving problems related to the theoretical and practical contents of the subject. They will be developed as autonomous work by the student. Methodology: Objective control test. Rating weight: 60%. Objective graphical test for learning assessment. It will consist of solving problems related to the theoretical and practical contents of the subject. * Observations of assessment: EVALUATION PROCEDURE NON-ATTENDANCE MODE COVID-19 The evaluation procedure will be diversified into two methodologies and will consist of a combination of two types of tasks: Autonomous Personal Work (graphic practices carried out asynchronously) and an Objective Control Test (synchronously) that will be delivered electronically to through the Moodle platform of the subject (Virtual Campus). The evaluation activities (graphic practices and objective tests) will adapt in their structure and format to the non-face-to-face modality and to the delivery by telematic form. For this reason, and in order to preserve the quality and reliability of the assessment process, they may undergo minor adjustments or modifications in relation to the type of those carried out during the course in person. VERY IMPORTANT All the tasks corresponding to the Final Evaluation, both the deliveries of autonomous personal work and the objective test of control, will be MANDATORY and must be delivered in a timely manner. Failure to carry out or turn in any of the proposed tasks will mean NOT PRESENTED. The originals of the exercises delivered must be kept by the student in order for the teachers to be able to carry out the appropriate checks. To pass the course, the student must achieve a MINIMUM NOTE OF 5 POINTS out of the 10 possible in the total sum of the marks obtained in the different assessment tasks but with the obligatory requirement of obtaining in the objective control test (synchronous) a NOTE MINIMUM of 1.8 POINTS on the 6 possible. ASSESSMENT TASKS A.- Personal work deliveries. Rating weight: 40% (4 points) The corresponding asynchronous delivery tasks will be generated on the Moodle platform in which the statements of the exercises and the delivery instructions will be indicated. B.- Objective control test. Rating weight: 60% (6 points) (*) It will be carried out synchronously by means of a connection

through Teams and with the delivery of tasks on the Moodle platform. The specific instructions for the test will be given at the beginning of the test through the Teams application. The indications of the teaching staff of the subject that will resolve any doubts about the statements and about the objective test through Teams must be followed at all times. In order to make the delivery in Moodle and be evaluated, it is MANDATORY that the student is connected to the Teams session during the entire objective control test.

(*) In order to pass the subject (global grade equal to or greater than 5 points) it will be mandatory to obtain a minimum grade of 1.8 points in this test.

VERY IMPORTANT: All the information on the evaluation procedures will be communicated through the Moodle platform of the subject (virtual campus), so frequent consultation of the subject is recommended. Any query, clarification or incident related to the evaluation procedure should be brought to the attention of the teachers responsible for the subject as soon as possible. In all the deliveries and tests, the indications of the teachers responsible for the subject must be followed MANDATORYLY.

5. Modifications of the bibliography or webgraphy.

The sources of basic and complementary information reflected in the teaching guide are maintained as students have at their disposal both on the Moodle platform of the subject (virtual campus) and on the web (online resources) all the necessary and sufficient documentation to the adequate study of the contents of the subject.

Study programme competences	
Code	Study programme competences
A2	Adquirir os coñecementos fundamentais sobre os sistemas e aplicacións informáticas específicos e xerais utilizados no ámbito da edificación.
A6	Coñecer e aplicar os distintos sistemas de representación así como as técnicas e procedementos de expresión gráfica aplicados á edificación e ás construcións arquitectónicas.
B1	Capacidade de análise e síntese.
B3	Capacidade para a procura, análise, selección, utilización e xestión da información.
B4	Coñecementos de informática relativos ao ámbito de estudo.
B5	Capacidade para a resolución de problemas.
B8	Capacidade para traballar nun equipo de carácter interdisciplinario.
B12	Razoamento crítico.
B14	Aprendizaxe autónomo.
B16	Capacidade de aplicar os coñecementos na práctica.
B25	Hábito de estudo e método de traballo.
B27	Capacidade de comunicación a través da palabra e da imaxe.
C1	Adequate oral and written expression in the official languages.
C3	Using ICT in working contexts and lifelong learning.
C4	Acting as a respectful citizen according to democratic cultures and human rights and with a gender perspective.
C5	Understanding the importance of entrepreneurial culture and the useful means for enterprising people.
C6	Acquiring skills for healthy lifestyles, and healthy habits and routines.
C7	Developing the ability to work in interdisciplinary or transdisciplinary teams in order to offer proposals that can contribute to a sustainable environmental, economic, political and social development.
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		
Understanding the geometry as a graphic model able to establish spatial relationships that allow understanding, description and control of construction and architectural forms.	A6	B1 B4 B12 B14 B25	C1 C3 C6 C7 C8
Knowing and applying graphical representations used in building and architecture through different systems, procedures and techniques.	A2 A6	B1 B4 B12 B14 B16 B25 B27	C1 C3 C6 C8
Identifying and understanding spatial relationships and the connection between the real sensible space and geometric space represented.	A6	B1 B4 B12 B14 B25	C1 C3 C5 C6 C8

Knowing the theoretical foundations of the different systems of graphic representation by applying them in building and architecture.	A6	B1 B4 B12 B14 B16 B25 B27	C1 C3 C6 C8
Knowing the main bodies and geometric surfaces in constructive and architectural applications, both in terms of mathematical concept as analysis and graphical representation in major systems.	A2 A6	B1 B3 B4 B5 B12 B14 B16 B25 B27	C1 C3 C4 C6 C8
Developing the ability known as "spatial imagination" so the student can "think space" (three-dimensional), an object represented in the plane (two dimensions), as well as being able to represent in the plane what has been previously imagined in space.	A2 A6	B1 B3 B4 B5 B12 B14 B16 B25 B27	C1 C3 C6 C7 C8
Knowing the complements of plane, spatial or projective geometry in general, necessary for the theoretical development of the course.	A6	B1 B3 B4 B12 B14 B25 B27	C1 C3 C6 C8
Knowing the terminology, fundamental concepts, conventions and theoretical principles that define the elements of Representation Systems in Building.	A6	B1 B4 B5 B8 B12 B14 B16 B25 B27	C1 C3 C4 C5 C6 C7 C8
Knowing and applying methods and paths of Representation Systems used in Building and Architecture.	A2 A6	B1 B3 B4 B5 B8 B14 B16 B25 B27	C1 C3 C4 C5 C6 C7 C8

Developing habits of clarity, simplicity and precision and the ability of understanding, analysing and synthesising knowledge and application of methods and paths of representation systems.	A6	B1 B3 B4 B5 B8 B12 B14 B16 B25 B27	C1 C3 C4 C5 C6 C7 C8
Learning to evaluate the solution of chosen paths using logical, coherent and technical criteria.	A6	B1 B4 B5 B8 B12 B14 B16 B25 B27	C1 C3 C4 C5 C6 C7 C8
Applying the methods and layouts of each of the studied Representation systems to the resolution of practical exercises.	A6	B1 B3 B4 B5 B8 B12 B14 B16 B25 B27	C1 C3 C4 C5 C6 C7 C8
Representing the primary geometric shapes in any position in space.	A2 A6	B1 B4 B5 B8 B12 B14 B16 B25 B27	C1 C3 C4 C5 C6 C7 C8
Solving positional problems of intersections, parallelism, perpendicularity and metrical problems of distances and angles determination between various geometric elements.	A6	B1 B3 B4 B5 B8 B14 B16 B25 B27	C1 C3 C4 C5 C6 C7 C8

Representing simple geometric shapes in different systems with special emphasis on the representation of elements and architectural, constructive or in any builgin applications.	A6	B1 B3 B4 B5 B8 B12 B14 B16 B25 B27	C1 C3 C4 C5 C6 C7 C8
Knowing the general principles of the Shadow Theory as geometric rationalization of the luminous phenomenon in the different systems of representation of architectural application.	A2 A6	B1 B4 B5 B8 B12 B14 B16 B25 B27	C1 C3 C4 C5 C6 C7 C8
Applying the figured planes system (topographic projection) to graphic resolution of roofs, to the representation of the terrain and the resolution of topographies modified in the execution of earthworks and roads.	A2 A6	B1 B4 B5 B8 B14 B16 B25 B27	C1 C3 C4 C5 C6 C7 C8
Assessing the graphical representation in aspects of communication and reflection.	A6	B1 B3 B4 B8 B12 B14 B25 B27	C1 C3 C4 C5 C6 C7 C8

Contents	
Topic	**Sub-topic**
Lesson I. DIHEDRAL REPRESENTATION SYSTEM: FUNDAMENTALS AND POSITIONAL PROBLEMS	Introduction. Basics. Fundamentals. Representation of point, line and plane. Spatial basic geometric relations. Parallelism. Intersections. Perpendicularity
Lesson 2.- DIHEDRAL REPRESENTATION SYSTEM: GRAPHICS METHODS AND METRIC PROBLEMS.	Geometric Procedures: Change of planes of projection. Rotations. Rotated Plane Method. Distances. Angles.
Lesson 3.- DIHEDRAL REPRESENTATION SYSTEM: ANALYSIS AND REPRESENTATION OF SURFACES	Representation of surfaces. Regular polyhedra. Radiating polyhedra: Pyramid and Prism. Radiated Quadrics: Cone and Cylinder. Representation of the Sphere.
Lesson 4. DIHEDRAL REPRESENTATION SYSTEM: INTERSECTION OF SURFACES AND THEORY OF SHADOWS	Intersection of surfaces. Methods. Architectural applications: vaults, domes and lunettes. Shadow Theory applied to Diedral System.

Lesson 5.- FIGURED PLANS SYSTEM (TOPOGRAPHICAL PROJECTION): FUNDAMENTALS	Introduction. Fundamentals. Representation of the plane. Positional Problems: parallelism, perpendicularity, intersections. Rotated plane method. Metrical problems: distances and angles. Representation of geometric surfaces.
Lesson 6.- FIGURED PLANS SYSTEM (TOPOGRAPHICAL PROJECTION): APPLICATIONS IN BUILDING. ROOFS. LANDSCAPE REPRESENTATION.	Graphical resolution of roofs. Topographical surfaces and interventions on the ground:dirt moving and road layout.

Planning				
Methodologies / tests	Competencies	Ordinary class hours	Student?s personal work hours	Total hours
Objective test	A2 A6 B1 B3 B4 B5 B7 B8 B12 B14 B16 B17 B25 B27 C1 C3 C4 C5 C6 C7 C8 C9	6	140	146
Personalized attention		4	0	4
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	Description
Objective test	Graphic test for the assessment of learning, whose distinctive feature is the ability to determine whether the answers are correct or not. It is a measuring element that allows to assess knowledge, abilities, skills, performance, attitudes, intelligence, etc. It is applicable for both diagnostic, formative and summative evaluation.

Personalized attention	
Methodologies	Description
Objective test	The needs and questions of the students related to the study or similar topics with the course will be adressed, while giving them orientation, support and motivation throughout the learning process.

Assessment			
Methodologies	Competencies	Description	**Qualification**
Objective test	A2 A6 B1 B3 B4 B5 B7 B8 B12 B14 B16 B17 B25 B27 C1 C3 C4 C5 C6 C7 C8 C9	Graphic test for the assessment of learning, whose distinctive feature is the ability to determine whether the answers are correct or not. It is a measuring element that allows to assess knowledge, abilities, skills, performance, attitudes, intelligence, etc. Representation Systems that are covered in the syllabus of the subject: Dihedral System and Topographical Projection.	100

Assessment comments
IMPORTANT NOTE. In order for the student to have a passing grade in the final exams he must obtain an overall average grade of 5 points or higher in the sum of the proposed exercises but it will be mandatory to score in the exercises corresponding to the Dihedral System and in the Topographical Projection System. A grading of 0 will cause the failing of the course.

Sources of information

Basic	- BARDÉS FAURA, Lluis; GIMÉNEZ RIBERA, José Manuel (1999). Geometría Descriptiva. Sistema Dièdric. Exercicis. Edicións UPC - BARDÉS FAURA, Lluis; GIMÉNEZ RIBERA, José Manuel (2001). Geometría Descriptiva. Plans acotats i perspectives. Exercicis. Edicións UPC - COBOS GUTIERREZ, Carlos (2001). Geometría para Ingenieros. Tomo I: Representación Diédrica. Tébar - COBOS GUTIERREZ, Carlos (2009). Geometría para Ingenieros. Tomo II: Sistema de Planos Acotados. Tébar - FERNÁNDEZ SAN ELÍAS, Gaspar (1999). Fundamentos del Sistema Diédrico. Universidad de León - FERNÁNDEZ SAN ELÍAS, Gaspar (2004). Sistema Acotado. Problemas y Aplicaciones. - FRANCO TABOADA, José Antonio (2011). Geometría Descriptiva para la representación arquitectónica. Vol. 1. Fundamentos. Santiago de Compostela: Andavira Editora - GENTIL BALDRICH, José María (1998). Método y aplicación de representación acotada y del terreno. - GIMÉNEZ PERIS, Vicente (2007). Diédrico Directo. Tomo I. Teoría y 190 ejercicios de aplicación. Edición del autor - GIMÉNEZ PERIS, Vicente (2014). Diédrico Directo. Tomo II. Superficies, Intersecciones, CAD, Sombras. Edición del autor - IZQUIERDO ASENSI, Fernando (Varias ediciones). Geometría Descriptiva. - MARTÍN MOREJÓN, Luís (1978-80). Geometría Descriptiva. Sistema Diédrico (2 vol). - RODRÍGUEZ DE ABAJO, F. J. (Varias ediciones). Geometría Descriptiva. Tomo I. Sistema Diédrico. - RODRÍGUEZ DE ABAJO, F. J. (Varias ediciones). Geometría Descriptiva. Tomo II. Sistema de Planos Acotados. - SÁNCHEZ GALLEGO, Juan Antonio (1997). Geometría Descriptiva. Sistemas de Proyección Cilíndrica. Edicións UPC - TAIBO FERNÁNDEZ, Ángel (2010). Geometría Descriptiva y sus aplicaciones. Tomo I. Punto, Recta y Plano.. Tébar - TAIBO FERNÁNDEZ, Ángel (2007). Geometría descriptiva y sus aplicaciones. Tomo II. Curvas y Superficies. Tébar
Complementary	- IZQUIERDO ASENSI, F. (2002). Construcciones Geométricas. - IZQUIERDO ASENSI, F. (2005). Fórmulas y Propiedades Geométricas. - IZQUIERDO ASENSI, F. (Varias Ediciones). Geometría Descriptiva Superior y Aplicada. - RENDÓN GÓMEZ, Álvaro (2016). Geometría paso a paso. Vol. I. Elementos de Geometría Métrica y sus aplicaciones en Arte, Ingeniería y Construcción. Editorial Tébar Flores

Recommendations
Subjects that it is recommended to have taken before
Subjects that are recommended to be taken simultaneously
Architectural Graphic Expression I [In extinction]/670G01008
Subjects that continue the syllabus
Geometry of Illustrations [In extinction]/670G01018
Other comments
By addressing the basics of graphical representation, it is recommended to study the subject of Descriptive Geometry prior or simultaneous to other subjects in the area of Architectural Graphic Expression.PREREQUISITES. It is recommended to have studied the subject of Technical Drawing in high school or equivalent training as it is considered that the student must be accustomed to using conventional instruments of graphical representation. They also should know the most basic aspects of the different systems of representation, especially Diedric System and basic flat geometry layouts (polygons, conic sections, elementary trigonometry, etc.).