Teaching Guide				
Identifying Data				2023/24
Subject (*)	Mathematical Techniques for Architecture		Code	630G02047
Study programme	Grao en Estudos de Arquitectura			
Descriptors				
Cycle	Period	Year	Type	Credits
Graduate	2nd four-month period	Fifth	Optional	4.5
Language	Spanish			
Teaching method	Face-to-face			
Prerequisites				
Department	Matemáticas			
Coordinador	Otero Piñeiro, Maria Victoria	E-mail	victoria.otero@udc.es	
Lecturers	Otero Piñeiro, Maria Victoria Rodriguez Seijo, Jose Manuel	E-mail	victoria.otero@udc.es jose.rodriguez.seijo@udc.es	
Web	campusvirtual.udc.gal/			
General description	The objective of this course is to provide specific knowledge of mathematics to facilitate professional work that requires numerical, statistical, optimization and parametric representation techniques.			

Study programme competences / results	
Code	Study programme competences / results
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
A65	Coñecemento avanzado de aspectos específicos da materia de Matemáticas no contemplados expresamente na Orde EDU/2075/2010
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
C1	Adequate oral and written expression in the official languages.
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

Advanced knowledge of specific aspects of mathematics not expressly contemplated in the EDU 2075/2010 order: Statistical methods, Modeling, Optimization, Numerical analysis.	A63 A65	B1 B2 B3 B4 B5	C1 C3 C4 C5 C6 C7 C8

Contents	
Topic	**Sub-topic**
Optimization in one and several variables.	Optimization in one variable. Optimization in several variables.
Models using Ordinary Differential Equations and Partial Differential Equations. Simulation.	Models through Ordinary Differential Equations. Models through Partial Differential Equations. Simulation.
Parametric control of curves and surfaces.	Parametric control of curves. Parametric control of surfaces.
Meshing methods. Mesh optimization.	Meshing methods. Mesh optimization.
Notions about statistics and probability. Applications in Architecture.	Notions about statistics. Notions about probability. Applications to quality control in Architecture.

Planning				
Methodologies / tests	**Competencies / Results**	**Teaching hours (in-person & virtual)**	**Student?s personal work hours**	**Total hours**
Guest lecture / keynote speech	A63 A65 B1 B2 B3 B4 B5 C1 C3 C4 C5 C6 C7 C8	9	18	27
Workshop	A63 A65 B1 B2 B3 B4 B5 C1 C3 C4 C5 C6 C8	18	51	69
Supervised projects	A63 A65 B1 B2 B3 B4 B5 C1 C3 C4 C5 C6 C7 C8	0	12	12
Objective test	A63 A65 B1 B2 B3 B4 B5 C1 C3 C4 C5 C6 C7 C8	3.5	0	3.5
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**
Guest lecture / keynote speech	Oral presentation complemented by the use of audiovisual media and the introduction of some questions addressed to the students, in order to transmit knowledge and facilitate learning.
Workshop	Training modality oriented to the application of learning in which various methodologies/tests can be combined (exhibitions, simulations, debates, problem solving, guided practices, etc.) through which students develop eminently practical tasks on a specific topic, with the support and supervision of teachers.

Supervised projects	Methodology designed to promote autonomous learning of students, under the tutelage of the teacher and in various scenarios (academic and professional). It refers primarily to learning "how to do things". It constitutes an option based on the assumption by students of responsibility for their own learning. This teaching system is based on two basic elements: the independent learning of the student body and the monitoring of this learning by the teacher/tutor.
Objective test	Written test used for the evaluation of learning, whose distinctive feature is the possibility of determining if the answers given are correct or not. It constitutes a measurement instrument, rigorously elaborated, that allows to evaluate knowledge, abilities, skills, performance, aptitudes, attitudes, intelligence, etc. It is applicable for both diagnostic, formative and additive evaluation. The objective test can combine different types of questions: multiple-choice, ordering, short-answer, discrimination, completion, and/or resolution questions. It can also be built with a single type of any of these questions.

Personalized attention	
Methodologies	**Description**
Guest lecture / keynote speech Workshop Supervised projects	Throughout the course each student should carry out two sessions of 30 minutes each with the teacher. In them the teacher will solve the doubts that the student presents.

Assessment			
Methodologies	**Competencies / Results**	**Description**	**Qualification**
Objective test	A63 A65 B1 B2 B3 B4 B5 C1 C3 C4 C5 C6 C7 C8	The evaluation of the students will be carried out by means of a final exam, which will consist of a theoretical-practical test on the matter that appears on the Syllabus of the subject.	70
Supervised projects	A63 A65 B1 B2 B3 B4 B5 C1 C3 C4 C5 C6 C7 C8	The student must carry out a work on a topic proposed by the teaching staff related to the subject that appears on the Syllabus.	30

Assessment comments
Both in the first and in the second opportunity, the student must submit the work that has been assigned to opt for passing the subject. In addition, he/she must obtain a minimum of 4 points out of 10 in the objective test score (2.8 points out of 7). Students who do not meet this requirement will have a fail grade at the corresponding opportunity (the numerical grade will be the minimum between 4.5 and the sum of the grades obtained in supervised work and the objective test). Both opportunities: The fraudulent performance of the tests or evaluation activities, once verified, will directly imply the qualification of suspense in the call in which it is committed: the student will be graded with fail (numerical grade 0) in the call of the academic year, whether the commission of the fault occurs on the first opportunity or on the second. To do this, the qualification of the first opportunity will be modified, if necessary.

Sources of information	
Basic	- Meerschaert, Mark M. (2013 (4ª edición)). Mathematical modeling. USA. Academic Press - Olarrea,J, Cordero,M (2010). Estadística para ingenieros. Madrid, García-Maroto Editores - Tedeschi, A (2011). Parametric Architecture. Italia, Le penseur
Complementary	Additional information at: https://campusvirtual.udc.gal/Additional information at: https://campusvirtual.udc.gal/

Recommendations
Subjects that it is recommended to have taken before
Mathematics for Architecture 1/630G02004 Mathematics for Architecture 2/630G02009
Subjects that are recommended to be taken simultaneously

Subjects that continue the syllabus
Other comments

(*)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.