

MATERIALS, WATER AND SOIL ENGINEERING (2020-21)

Código: D026	Fecha de aprobación: 04/06/2010	Precio: 39,27 1st registration credits
Créditos: 60	Título: Master (ECTS)	

RAMA

Engineering and Architecture

PLAN

UNIVERSITY MASTER'S DEGREE IN MATERIALS, WATER AND LANDSCAPE ENGINEERING

TIPO DE ENSEÑANZA

Face-to-face

CENTROS DONDE SE IMPARTE

Polytechnic School

ESTUDIO IMPARTIDO CONJUNTAMENTE CON

Solo se imparte en esta universidad

FECHAS DE EXAMEN

[Acceda al listado de fechas de examen para esta titulación.](#)

PLAN DE ESTUDIOS OFERTADO EN EL CURSO 2020-21

Leyenda: No ofertada Sin docencia

SOLE

COMPULSORY SUBJECTS

33 créditos

Curso	Título	Créditos	Subject
1	COMPULSORY	3	11901 - STATISTICAL METHODS APPLIED TO ENGINEERING
1	COMPULSORY	3	11902 - PHYSICAL FUNDAMENTALS OF VIBRATORY AND UNDULATORY PHENOMENA
1	COMPULSORY	3	11903 - DYNAMIC ANALYSIS OF STRUCTURES FOR ANTI SEISMIC CONSTRUCTION
1	COMPULSORY	3	11906 - SCIENCE AND TECHNOLOGY OF INORGANIC BINDERS AND PHYSICO-CHEMICAL DETERIORATION PROCESSES OF CONCRETE
1	COMPULSORY	3	11907 - SUPPLEMENTARY CEMENTING MATERIALS AND SUSTAINABILITY IN CIVIL ENGINEERING
1	COMPULSORY	3	11908 - DURABILITY OF CONCRETE CONSTRUCTIONS
1	COMPULSORY	3	11909 - METALLIC CORROSION IN CONSTRUCTION
1	COMPULSORY	3	11910 - SPECIAL CONCRETES
1	COMPULSORY	3	11917 - INTRODUCTION TO GIS
1	COMPULSORY	3	11918 - ROCK MECHANICS
1	COMPULSORY	3	11924 - HYDRAULIC STRUCTURES

OPTIONAL SUBJECTS

21 créditos

Curso	Título	Créditos	Subject
1	OPTIONAL	3	11904 - FINITE ELEMENT METHOD AS APPROXIMATION METHOD APPLIED TO ENGINEERING PROBLEMS
1	OPTIONAL	3	11905 - NUMERICAL METHODS WITH SYMBOLIC MANIPULATORS APPLIED TO ENGINEERING PROBLEMS
1	OPTIONAL	3	11911 - PHYSICO-MECHANICAL CHARACTERIZATION OF CONCRETE WITH RECYCLED AGGREGATES
1	OPTIONAL	3	11912 - METHODS OF DETECTION AND PREVENTION OF DAMAGE IN BUILDINGS AND CIVIL STRUCTURES
1	OPTIONAL	3	11913 - EXPERIMENTAL PROCEDURES FOR ASSESSING CORROSION
1	OPTIONAL	3	11914 - MULTIFUNCTIONAL CONDUCTIVE CONCRETES
1	OPTIONAL	3	11915 - MICROSTRUCTURAL CHARACTERIZATION TECHNIQUES OF CONSTRUCTION MATERIALS
1	OPTIONAL	3	11916 - DESIGN OF STRUCTURES WITH COMPOSITE MATERIALS
1	OPTIONAL	3	11919 - SLOPE AND HILLSIDE STABILITY
1	OPTIONAL	3	11920 - PATHOLOGY OF FOUNDATIONS
1	OPTIONAL	3	11922 - ANALYSIS OF NON-INVASIVE TECHNIQUES FOR CIVIL ENGINEERING
1	OPTIONAL	3	11923 - BASICS ON FINITE ELEMENTS MODELING
1	OPTIONAL	3	11925 - ADVANCED FLUVIAL ENGINEERING
1	OPTIONAL	3	11926 - INNOVATIONS IN COASTAL AND MARINE WORKS

MASTER FINAL WORK

6 créditos

Curso	Título	Créditos	Subject
1	END OF MASTER WORK	6	11921 - MASTER'S THESIS

Superado este bloque se obtiene

MASTER'S DEGREE IN MATERIALS, WATER AND SOIL ENGINEERING

OBJECTIVES

The objective of this Master's Degree course is to train professionals and academics in the fields of construction and soil engineering, with the aim of meeting the growing demand for experts which has arisen as a result both of an increase in the construction of infrastructures and of the interest shown in environmentally aware management of hydraulic resources in terms of soil and structures. The course offers a wide range of options in the fields of Materials and Soil Engineering, and represents a cross-disciplinary training which integrates Hydraulics as a dynamic agent affecting the materials involved in engineering and the natural processes which influence structures and the soil on which they are built.

The Master's course consists of practical and specialised courses which also address the specific needs of the various branches of Materials Engineering ("Special Concretes" and "Durability of Concrete Structures", among others), of Soil Engineering ("Rock Mechanics" and "Foundation Pathologies", among others) and Hydraulic Engineering ("Hydraulic Structures").

It also includes subjects which serve as a point of connection between Hydraulic and Soil Engineering, through the flow of dense fluids ("Advanced River Engineering"), and between these and Materials Engineering, through an examination of coastal dynamics, how the coast is affected and the tools available and necessary for its protection ("Innovation in Maritime and Coastal Works"). These subjects have been designed in order to provide the experience and basic tools necessary for undertaking research.

In addition to providing a training in theoretical research and practice specific to different fields of application, the individual subjects offered within the subject areas provide a training which covers generic, cross-disciplinary needs, focusing on topics common to the different branches of Engineering such as the use of cartographic tools for land management ("Introduction to GIS") or numerical methods ("Finite Elements Method as an Approach Applied to Engineering Problems", "Numerical Methods and Symbol Manipulators Applied to Engineering Problems", "Statistical Methods Applied to Engineering"). A series of courses has thus been established enabling students to choose their area of study, and which contributes to a specialised, cross-disciplinary and multi-disciplinary training.

The principle objective of the programme is to train specialised professionals and researchers in the application of methodologies and techniques for detection, diagnosis, analysis and representation, decision-making, assessment and the preparation of studies and projects in sustainable engineering in relation to the natural environment and the natural processes that occur therein.

Complementary to the students' curriculum, the Master's Degree course offers a number of activities aimed at providing students with multidisciplinary opportunities and experiences, similar to those offered on the Master's courses in "Soil and Seismic Engineering" (Polytechnic University of Catalonia) or "Architecture, Structures and Technology" (Polytechnic of Milan), among other national and international benchmark centres.

Besides attaining abilities, skills and knowledge in areas of engineering pertaining to the interaction of construction materials with soil and water (which is of great importance when undertaking research in related areas in order to obtain a doctorate), students will also acquire the professional skills described by national and international networks and organisations, enabling a deeper understanding of civil engineering.

Having successfully completed their Master's Degree, students will have attained a sufficient scientific, technical and methodological level to undertake design, planning, management, maintenance, conservation and exploitation, and will be able to apply their technical capacity to R&D&i projects or to advanced technical professional practice.

The fundamental objective of this Master's Degree course is to offer students an advanced, multidisciplinary training aimed at professional research, which will equip them to successfully enter the following rapidly developing fields of engineering:

Research in Hydraulic Engineering.

Research in Materials Engineering.

Research in Soil Engineering.

Research in Hydraulic Engineering (projects, construction and maintenance of hydraulic structures, management, planning and exploitation of hydraulic infrastructures, planning hydraulic resources, town planning based on sustainable development).

Research in Materials Engineering (standards, bases and mechanisms of corrosion, new construction materials and their applications, materials testing, environmental sustainability criteria, techniques for characterising, modelling, reporting and diagnosing structural damage, durability of materials).

Research in Soil Engineering (observation and diagnosis of foundation and wall pathologies, writing reports, constructive solutions, improvement techniques, calculating slope and hillside stability, instrumentation systems, numerical models, testing techniques, geographic information systems, database design).

Application of the appropriate research methodologies to the above lines of research.

For each area of research, a more detailed explanation is given below of these objectives as they relate to students' training:

- To possess current knowledge of each subject area:

or Research problems which have been resolved, together with the techniques used,

or Research problems which remain unresolved,

or Currently open areas of research.

- To study techniques which improve on the presently existing possibilities.
- To explain the importance of working in these subject areas.
- Demands arising from the scientific community.
- Demands arising from business and society.
 - Implementation of one of these techniques in the laboratory,
 - Proposal for a new solution to one of the presently unresolved research problems.

- [Structure of the Master's Degree: credits and subjects](#)
- [Distribution of subjects by year/semester](#)
- [General course programme](#)

MASTER'S DEGREE: CREDITS AND SUBJECTS

Subject type	Credits
Compulsory (OB)	33
Optional (OP)	21
Master's Final Project (OB)	6
TOTAL CREDITS	60

DISTRIBUTION OF SUBJECTS BY YEAR/SEMESTER

FIRST SEMESTER 30 ECTS			SECOND SEMESTER 30 ECTS		
SUBJECT	TYPE	ECTS	SUBJECT	TYPE	ECTS
THE BASICS OF PHYSICS AND MATHEMATICS APPLIED TO ENGINEERING					
STATISTICAL METHODS APPLIED TO ENGINEERING	OB	3	NUMERICAL METHODS AND SYMBOL MANIPULATORS APPLIED TO ENGINEERING PROBLEMS	OP	3
			FINITE ELEMENTS METHOD AS AN APPROACH APPLIED TO ENGINEERING PROBLEMS	OP	3
THE BASIC PHYSICS OF VIBRATIONS AND WAVE PHENOMENA	OB	3	NUMERICAL METHODS AND SYMBOL MANIPULATORS APPLIED TO ENGINEERING PROBLEMS	OP	3
			NON-INVASIVE ANALYSIS TECHNIQUES APPLIED TO CIVIL ENGINEERING	OP	3
DYNAMIC ANALYSIS OF STRUCTURES APPLIED TO ANTI-SEISMIC CONSTRUCTIONS	OB	3	BASIC ASPECTS OF FINITE ELEMENT MODELLING	OP	3
			HYDRAULIC ENGINEERING		
HYDRAULIC STRUCTURES	OB	3	ADVANCED RIVER ENGINEERING	OP	3
			INNOVATION IN MARITIME AND COASTAL STRUCTURES	OP	3
MATERIALS ENGINEERING					
SCIENCE AND TECHNOLOGY OF INORGANIC CONGLOMERATES AND PHYSICAL-CHEMICAL PROCESSES OF DETERIORATION IN CONCRETE	OB	3	PHYSICAL AND MECHANICAL CHARACTERISATION OF CONCRETES CONTAINING RECYCLED AGGREGATES	OP	3
SUPPLEMENTARY CEMENTING	OB	3	METHODOLOGY OF PREVENTION AND	OP	3

MATERIALS AND SUSTAINABILITY IN CIVIL ENGINEERING			DETECTION OF DAMAGE IN CIVIL WORKS STRUCTURES AND CONSTRUCTIONS			
			EXPERIMENTAL PROCEDURES FOR CORROSION STUDIES	OP	3	
DURABILITY OF CONCRETE STRUCTURES	OB	3	MULTIFUNCTIONAL CONDUCTIVE CONCRETE	OP	3	
METALLIC CORROSION IN CONSTRUCTION	OB	3	MICROSTRUCTURAL CHARACTERISATION TECHNIQUES IN CONSTRUCTION MATERIALS	OP	3	
SPECIAL CONCRETES	OB	3	DESIGN OF STRUCTURES USING COMPOSITE MATERIALS	OP	3	
SOIL ENGINEERING						
INTRODUCTION TO GIS	OB	3	ROCK MECHANICS	OB	3	
			SLOPE AND HILLSIDE STABILITY	OP	3	
			FOUNDATION PATHOLOGIES	OP	3	
MASTER'S FINAL PROJECT				OB	6	

GENERAL COURSE PROGRAMME

The course programme consists of four subject areas containing the 11 compulsory subjects and 14 optional subjects offered. Subjects have been grouped according to subject matter, providing coherent training related to the current areas of research offered in the doctorate programmes of those departments involved in the teaching of this course.

A brief description is given below of the subject areas:

1. Basics of physics and mathematics applied to Engineering (FFMAI)
2. Hydraulic Engineering (IA)
3. Materials Engineering (IM)
4. Soil Engineering (IT)

1.- The basics of physics and mathematics applied to Engineering (FFMAI): The aim of this subject is to extend and update knowledge in basic physics and mathematics, and in scientific research, thus enabling students to develop their ability to rigorously apply such knowledge to their own research .

2.- Hydraulic Engineering (IA): The aim of this subject is to offer students specific knowledge relevant to design, projects and studies related to the rehabilitation of hydraulic works, the management of hydraulic resources, the study of floods and the application of mathematical models for use in advanced river engineering.

3.- Materials Engineering (IM): This subject includes the study of the basic concepts of special concretes, including their characterisation, production and technology. In addition, the durability of concrete constructions will be studied in-depth, examining the science and technology of conglomerates, metal corrosion and the methodology of prevention and detection of damage. Likewise, students will study techniques for the microstructural characterisation of materials.

4.- Soil Engineering (IT): This subject addresses the concepts of rock mechanics and modelling using numerical methods. In addition, advanced concepts in the study of slope and hillside stability are examined, together with foundation pathology. Lastly, students are provided with an introduction to geographical information systems and their applications in land management.

- [Entry Requirements](#)
- [Admission and Assessment Criteria](#)
- [Pre-enrolment and Enrolment](#)
- [Number of Places](#)

ENTRY REQUIREMENTS

According to the Regulations of the University of Alicante, the following requirements must be complied to have access to official taught Master's degrees:

1. To be in possession of a SPANISH OFFICIAL GRADUATE DEGREE CERTIFICATE or other issued by an institution of higher education within the [EHEA](#) (European Higher Education) that enables the holder to have access to Master's degrees in the issuing .
2. To be in possession of an officially approved FOREIGN HIGHER EDUCATION DEGREE CERTIFICATE that had been recognised as equal to the degree that allows access to the requested studies.
3. To be in possession of a UNIVERSITY DEGREE CERTIFICATE obtained in a University or Higher Education Institution of COUNTRIES OUTSIDE THE EHEA, without the prior approval of their studies. In this case, the following should be considered:
 - Non- recognised degree certificates shall require a technical report showing an equivalence statement issued by the University of Alicante ([ContinUA – Continuing Education Centre](#)), for which the [corresponding fee](#) should be paid.
 - Access through this way does under no circumstances imply prior official approval of the holder's degree certificate, nor its recognition for purposes other than studying a master's degree.

ADMISSION AND ASSESSMENT CRITERIA

1. Admission Profile

For admission to the University Master's Degree course in Materials, Hydraulic and Soil Engineering at the University of Alicante, applicants should hold one of the following:

1. An officially recognised Spanish Degree in Civil Engineering, Construction Engineering or a qualification as Architect, Industrial Engineer or related field.
2. A 5-year Degree in Road, Canal and Port Engineering, Chemistry, Physics, Geological Engineering, Architecture, Industrial Engineering or related fields, obtained according to course programmes in existence prior to the enactment of RD 1393/2007.
3. A 3-year Degree in Public Works, Architectural Technology, Industry or Mining, or related fields, obtained according to course programmes in existence prior to the enactment of RD 1393/2007, having successfully completed a number of credits equivalent to at least 180 ECTS credits.
4. An official university qualification issued by a higher education institution forming part of the European Space for Higher Education, officially equivalent to the qualifications indicated in points 1 and 2 above, and which qualifies the holder for admittance onto a Master's Degree course in the issuing country.
5. A non-homologated qualification from abroad, accrediting a level of training equivalent to the corresponding official Spanish university qualifications indicated in points 1 and 2 above, and which qualifies the holder for admittance to a Master's Degree course in the issuing country.

2. Assessment criteria

The selection criteria employed by the Master's Academic Committee are:

- a) A three, four or five year Degree in Road, Canal and Port Engineering, Chemical Engineering, Physics, Geology, Architecture, Industrial Engineering , Public Works, Mining, or qualifications in related disciplines which are eligible for conversion to 240 European credits.
- b) Level of achievement reflected in the academic record.
- c) Grades obtained in subjects related to the Master's Degree.

The Master's Academic Committee will specify the selection criteria for adjudicating admissions to the Master's Degree. These criteria will be published on the Master's official web page during the pre-enrolment period. Where admission is denied, the Master's Academic Committee will provide the applicant with a written explanation of their decision.

PRE-ENROLMENT AND ENROLMENT

PRE-ENROLMENT [+info](#)

Students who intend to study for an officially recognised Master's Degree at the UA should complete pre-enrolment in accordance with the guidelines and deadlines specified annually.

ENROLMENT [+info](#)

Following publication of the final list of those admitted to the course, an email containing a user password will be sent to successful applicants, enabling

them to enrol via the **Campus Virtual** in accordance with the guidelines and deadlines specified annually.

In the registration process, the **documents issued abroad** must be official, duly notorised and translated. Further information:

- <http://sqa.ua.es/en/academic-regulations/legalizacion/legalization-of-documents.html>

NUMBER OF PLACES

COURSE	NUMBER OF PLACES
2012-13	40
2013-14	40
2014-15	40
2015-16	40
2016-17	40

- [Focus](#)
- [Degree course specialisation profile](#)
- [Professional profile](#)

FOCUS

Professional.

DEGREE COURSE SPECIALISATION PROFILE

The main objective of the Master's Degree is to enable students to acquire the professional skills necessary for the teaching profession, in line with the commonly accepted criteria and in compliance with current legislation.

Within the framework of the design of this Master's degree, it was considered that initial training should provide future teachers with the theoretical knowledge, practical skills, attitudes, interaction with colleagues and teaching practice necessary to provide the basis for further professional development. Indeed, life-long professional development is greatly influenced by the initial training received.

In this respect, the course programme is primarily aimed at producing teaching professionals, although the importance of undertaking educational research has not been overlooked. Thus, the role of research in the professional development of teachers is emphasised through the teaching practice.

It is necessary for teacher training to stress the teacher's role as mediator between personal and social development and learning, encouraging the personal, scientific and cultural education of students as citizens able to participate, exercise their rights and fulfill their obligations in a democratic society.

The aims of the Master's Degree programme are as follows:

- To encourage the development of a holistic and analytical approach to the educational, social, cultural and environmental problems of our times.
- To foster a positive, critical attitude to professional identity.
- To encourage collaboration with other professionals within the educational context.
- To foster the use of research processes within the classroom as the basis for professional development.
- To provide a suitable cultural, personal, ethical and social training for teaching adolescents.
- To encourage an understanding of the relationships between learning models, the school context and the teaching approaches used in professional practice.
- To foster recognition, understanding and awareness of student diversity, based on their level of development, family background as well as the social and cultural contexts.

Achieving these objectives will enable future teachers to gain the required professional skills for their vocation. Completion of this training programme also results in the progressive acquisition of educational skills, together with skills associated with the overall teaching and learning processes.

PROFESSIONAL PROFILE

Professions for which the degree qualifies its holder

Compulsory and Post-Compulsory Secondary Education Teacher, Vocational Training Teacher, Foreign Language Teacher, Arts or Sports Teacher.

- [Verified Report](#)
- [Resolution from the Universities Council: Positive verification](#)
- [Resolution from the Universities Council: Accreditation renewal](#)
- [Authorization from the Valencian Government](#)

Internal Quality Assurance System (SGIC) of the Title

- Structure of the Centre for Quality
 - [Comission of Internal Quality Guarantee](#)
 - [Other Commissions](#)
- [Handbook SGIC](#)
- [Procedures](#)
 - [Strategic \(PE\)](#)
 - [Key \(PC\)](#)
 - [Support \(PA\)](#)
 - [Measurement \(PM\)](#)
- [Management of the SGIC \(Access to ASTUA\)](#)

Follow-up of the Title

- [Self-reports UA](#)
- [External reports AVAP](#)
- [Other reports](#)
- [Improvement Plans](#)
- [Progress and Learning Outcomes](#)

Information about the Centre	General information for students
<ul style="list-style-type: none"> • Polytechnic University College Campus de San Vicente del Raspeig Ctra. de Alicante s/n 03690 San Vicente del Raspeig (Alicante) Telephone:+ 34 96 590 3648 Fax:+ 34 96 590 3644 eps@ua.es http://www.eps.ua.es • Life Long Learning Centre (ContinUA) <p>Only for pre-enrolment formalities</p> <p>Ground Floor Germán Bernácer Building Telephone:+ 34 96 590 9422 Fax: + 34 96 590 9442 continua@ua.es https://web.ua.es/en/continua/</p>	<ul style="list-style-type: none"> • Grants and assistance • Accommodation • Student refectories and cafeterias • Transport • Emergency medical care • Insurance • Services for students with special needs • Student representation and participation • University student identity card (TIU) • Frequently asked questions
UA: General Regulations	+ Information about qualifications
<ul style="list-style-type: none"> • Academic regulations and procedures of the University of Alicante 	<ul style="list-style-type: none"> • Official State Gazette (BOE) on publication of course programmes Error Correction • Own Web • Information pamphlet • Video presentation of the degree • Details title on RUCT