Teaching Guide					
Identifying Data					2017/18
Subject (*)	Master Dissertation			Code	632844216
Study programme	Mestrado Universitario en Enxeñaría da Auga (plan 2012)				
Descriptors					
Cycle	Period		Year	Type	Credits
Official Master's Degree	1st four-month period		First	Obligatoria	15
Language	English				
Teaching method	Face-to-face				
Prerequisites					
Department	BioloxíaComputaciónEnxeñaría CivilEnxeñaría Naval e IndustrialMatemáticas				
Coordinador	Rodríguez-Vellando Fernández-Carvajal, Pablo		E-mail	pablo.rodriguez-vellando@udc.es	
Lecturers	Delgado Martin, Jordi Juncosa Rivera, Ricardo Martínez Díaz, Margarita Naves García-Rendueles, Acacia Rodríguez-Vellando Fernández-Carvajal, Pablo Servia García, María José Vázquez González, Ana María		E-mail	jorge.delgado@udc.es ricardo.juncosa@udc.es margarita.martinez@udc.es acacia.naves@udc.es pablo.rodriguez-vellando@udc.es maria.servia@udc.es ana.maria.vazquez@udc.es	
Web	http://caminos.udc.es/info/asignaturas/201/masterindex.html				
General description	The concepts learned in the developed master are developed in project				

Study programme competences	
Code	Study programme competences
A1	Knowledge, understanding and capacity to apply legislation related with water engineering during professional development. Capacity to analyse the working mechanism of the economy and public and private management of water
A2	Capacity to resolve basic physical problems of water engineering and theoretic and practical Knowledge of the chemistry, physics, mechanics and technologic properties of the water
A3	Capacity to apply the mechanics of the fluids and the fundamental flow equations in calculate for conductions at pressure and in free layer
A4	Capacity to apply the hydrology knowledge and the principles of flow mechanics in the method of calculations about hydrology as well as surface and underground. Capacity to make the evaluation of the hydraulic resources and apply the principal tools to do the hydrologic planning and the regulation and lamination of the inputs Capacity to analyse the river hydraulics and to apply the knowledge acquired in the restauration of the river direction and other works about rivers and their surroundings
A5	Knowledge of the basic concepts about ecology applied to water engineering. Capacity to act in the respectful way and enriching way about the environment contribution to the sustainable development. Capacity to analyse the ecological quality of water. Knowledge of the basic principles of the ecology and basic understanding of the working continental water systems
A6	Capacity to analyse the mechanism of the economy working and the public and private management of water
A7	Knowledge of the fundamentals about the evaluation of water resources and the principal tools for the hydrological planning, starting from theoretical justification and practical applications that lead to the specific problem resolution and the use of updated methodologic (programs and models) for the evaluation of the exploitation, uses, defence, and the management the combined planning of surface and underground water. Knowledge of national and hydrological plans
A8	Capacity to calculate and manage of extreme avenues
A9	Knowledge of geographical information systems (SIG) applied to the management of water resources. Knowledge of the basic working of the system for the analysis of the geographical data, making use of SIG tools and support management and the analysis of data regarding water resources. Knowledge of the geospatial data and his characteristics and the processes for its acquisition, storage treatment analysis, modelling and presentation
A10	Understanding of the fundaments of dynamic fluid computation (CFD). Capacity to elaborate codes that can resolve non-understandable flow on the surface as well as in the porous media

A11	Knowledge of numerical models applied to hydraulic engineering. Capacity to use and analyse the results of the hydraulic models. Capacity to design, develop and analyse numerical schemes used in a hydraulic models
A12	Capacity to use commercial numerical models for flux in free layer, flow pressure, drainage, hydrologic calculations for avenues, sediment transport in rivers and costal zones, transport of contaminants and wave propagation
A13	Knowledge of the experimental technics applied to the water engineering. Capacity to design experiments. Capacity to develop reduced models in the laboratory. Capacity to use different types of experimental instrumentation, including flowmeter, depth probes, three-dimensional speedometer, limnimeter, windlass..
A14	Knowledge and understanding for design and construction of scale-models of hydraulic structures. Understanding of different technics that exist in the measurement of physical conditions (pressure, temperature, speed?) in the field of hydraulic knowledge of computing systems and electronic control and the acquisition of hydraulic data (monitoring and control of the river basin, hydraulic circuit, etc)
A15	General vision and balanced of the basic aspects and application of underground hydrologic from the needs of civil engineering. Capacity to Project or interpret the different hydraulic trials of hydrodynamic characterization, interpret hydrogeological maps and know the constructive aspects of the water uptake
A16	Knowledge of the chemical basis of water which totally condition its behaviour in nature and its uses. Understanding and knowledge of the different water regulations for quality at local, national and European level
A17	A global vision of water supply by the distinct elements which form it, at the same time having the necessary knowledge for its basis dimensioning and technological aspects related to its management and constructive implementation
A18	Capacity to realize an integral use and efficient use of water resource. Knowledge of the working of the basin organisms and general analysis of water engineering projects in the area of cooperation and development and humanitarian aid.
A19	Knowledge of advanced water treatment with different conclusions: depuration, re-use, purification, elimination of nutrients and regeneration treatments
A20	Use and management of measuring equipment in the field and in the laboratory. Knowledge of the methodology of control process and the determination of design parameters for water treatment processes
A21	Knowledge of water quality control models. Capacity to analyse and propose solutions to problems in water quality control
A22	Capacity to plan, to Project, to measure and to direct the constructions and exploitation of water conducts, reservoirs, hydroelectric installations, river regulations systems, water channels, river works, and other hydrologic and hydraulics Works
A23	Fundamental knowledge of energy consumption and its environmental implications inside a development sustainable
A24	Capacity to design and manage the water supply and treatment in a population area, including design and Project for solutions regarding water treatment, drainage, and advanced management of residual waters in the city. Knowledge regarding advanced processes for the water treatment, elimination of nutrients, and management strategy in times of rainwater
A25	Knowledge and understanding of water in different situations: the working of ecosystems, environmental factors with the purpose of to make an inventory of medium, applying the methodology to value the impact and its use in studies and evaluations of the environmental impact.
B1	To resolve problems effectively
B2	To apply critical thinking, logic and creativity
B3	To work individually with initiative
B4	To communicate effectively in work surroundings
B5	Continuous recycling of knowledge in a general perspective in a global situation of water engineering
B6	Understanding of the need to analyse history to understand the present
B7	Facility to integrate in multidiscipline teams
B8	Capacity to organize and plan
B9	Capacity for analysis, synthesis and structure of information and ideas
C1	To understand the importance of the enterprising culture and to know the means at the reach of the enterprising people
C2	To value knowledge critically, technology and available information to resolve problems that they will face
C3	To assume as a professional and citizen the importance of learning throughout life
C4	To value the importance of the investigation, innovation and technology development in the social ?economic advance and cultural in society
C5	To posses and understand knowledge that gives a base or oportunity to be original in the development and for applications of ideas, often in the context of investigation

C6	The students must be able to apply the acquired knowledge and their capacity to resolve problems in new surrandings or not well known within wider contexts (or multidiscipline) related with the study area
C7	The students must be able to integrate knowledge and to affront the complexity to formulate judgements from information that, been incomplete or limited, include reflexions about social responsabilities and ethics related to the application of the knowledge and judments
C8	The students must be able to comunicate their conclusions, knowledge and the last reasons that support them, to spezialated publics and not spezialated in a clear and unambiguous way.
C9	The student must possess the learning ability with permits them to continues to study in a manner wich will be in a great measure self directed and individual

Learning outcomes			
Learning outcomes	Study programme competences		
Students must write a final master thesis as a mandatory requirement for obtaining the Master Degree in Water Engineering	AC1	BC1	CC1
	AC2	BC2	CC2
	AC3	BC3	CC3
	AC4	BC4	CC4
	AC5	BC5	CC5
	AC6	BC6	CC6
	AC7	BC7	CC7
	AC8	BC8	CC8
	AC9	BC9	CC9
	AC10		
	AC11		
	AC12		
	AC13		
	AC14		
	AC15		
	AC16		
	AC17		
	AC18		
	AC19		
	AC20		
	AC21		
	AC22		
	AC23		
	AC24		
	AC25		

Contents	
Topic	Sub-topic

The students should write a final master work as an obligatory requirement to obtain the tittle of Master in Water Engineering. In order to do so, the coordinator of the host university will appoint a tutor being an expert on the subjects that students might choose as the object of their dissertations. The purpose of the dissertation is a research/practical work in any field related to Water Engineering. The dissertation can be developed at the Universities of A Coruña, Magdeburg or other universities with which they have bilateral agreements. Upon completion of the work, the tutor will receive a report which will be assessed by a examination board with three members, to be established at the host university. There will be a normalized format for all the students that will be ajusted to this. The students will have to give a copy to each memeber of the tribunal at least, one week before the presentation. The language in wich it is written and presented will be in english	There are no subtopics

Planning				
Methodologies / tests	Competencies	Ordinary class hours	Student?s personal work hours	Total hours
Supervised projects	A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13 A14 A15 A16 A17 A18 A19 A20 A21 A22 A23 A24 A25 B1 B2 B3 B4 B5 B6 B7 B8 B9 C1 C2 C3 C4 C5 C6 C7 C8 C9	0	355	355
Personalized attention		20	0	20
(*)The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.				

Methodologies	
Methodologies	Description
Supervised projects	Depending on the supervisor

Personalized attention	
Methodologies	Description
Supervised projects	Depending on the supervisor

Assessment			
Methodologies	Competencies	Description	Qualification

Supervised projects	A1 A2 A3 A4 A5 A6 A7 A8 A9 A10 A11 A12 A13 A14 A15 A16 A17 A18 A19 A20 A21 A22 A23 A24 A25 B1 B2 B3 B4 B5 B6 B7 B8 B9 C1 C2 C3 C4 C5 C6 C7 C8 C9	Development of the memory report as a final work of master. Oral and written presentation of this memory wich will be evaluated by a tribunal constituted in the receiving university Quality of the report and dissertation will be evaluated.	100

Assessment comments
Examination board constituted by three lecturers, including the supervisor and the coordinator of the master degree.20 minutes talk plus questions. Report submission (one week prior to the dissertation)

Sources of information	
Basic	
Complementary	

Recommendations
Subjects that it is recommended to have taken before
Hydrological planning and projects/632844201 Water supply and drainage systems/632844202 Physico-chemistry and quality of water/632844203 Hydraulic planning and projects/632844208 GIS and hydrology/632844209 Restoration ecology/632844210 Internships/632844215
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.