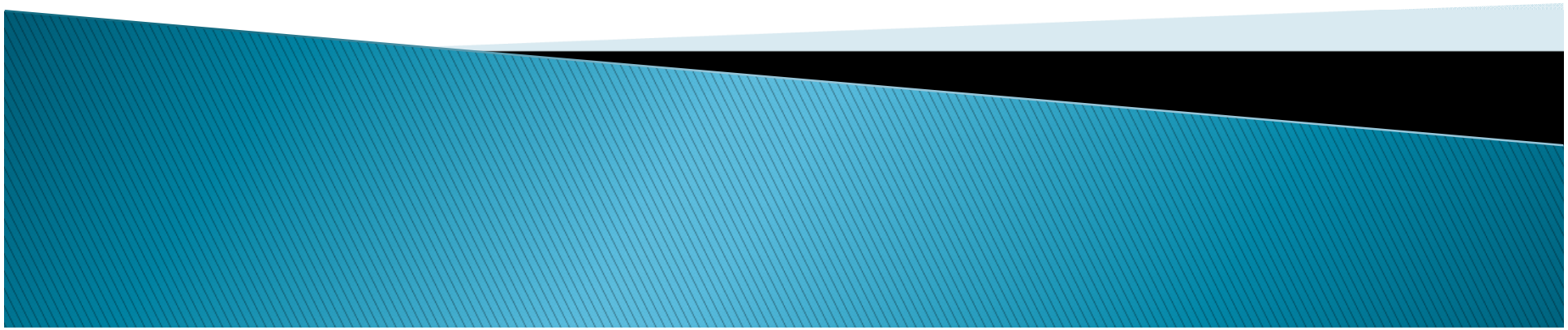
Master in Water Engineering

INTERNATIONAL MASTER IN WATER ENGINEERING

Hochschule Magdeburg • Stendal

UNIVERSIDADE DA CORUÑA

Official Master that since 2012 has been carried out between the universities of A Coruña and Hochschule Magdeburg-Stendal (Germany), with the collaboration of other prestigious international institutions.



OBJECTIVE

To train professionals and researchers of water, both in its technical and engineering aspects as scientific and academic, with an international vision

OBJECTIVE

The graduates acquiere experience in national and international water management:

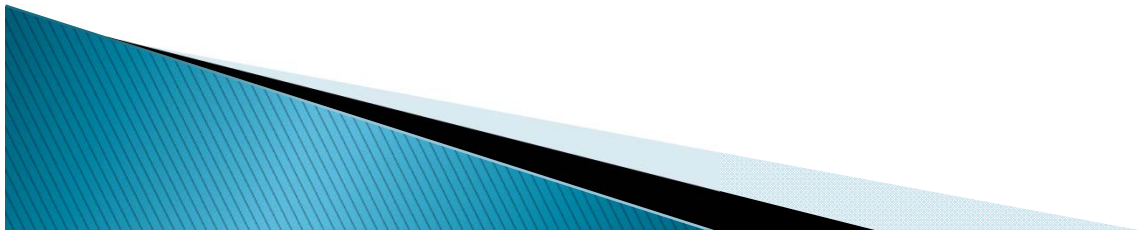
- Management of wastewater and drinkingwater
- Planning processes
- Hydrology
- Hydraulic engineer
- hydraulic experimental
- Ecology restitution
- Biotechnology water
- River morphology
- Flow and process modelling

PROFESSIONAL AND ACADEMIC OUTPUTS

The training acquired by the students, enable them as professionals specializing in water issues and qualified to work in companies specialized and general consulting, laboratories, service companies, construction companies

Qualified personnel for the development of activities of research and development

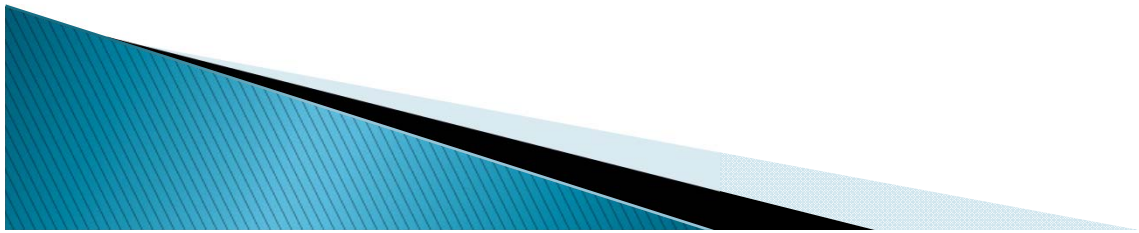
WHEN THE STUDENTS HAVE COMPLETED THIS MASTER, THEY WILL OBTAIN *THE TITLE OF THE* MASTER DEGREE IN WATER ENGINEERING WHICH IS VERIFIED BY SPANISH AND GERMAN EDUCATION AUTHORITIES



Teaching completly in English

Total number of ECTS: 90

The master consists of 3 terms



First Term(A Coruña)

- Dates: 1st of October to 31st of January
- Place: Civil Engineering School
- 30 ECTS

Civil Engineering School

Building: Área Científica: Class 2.3

First Term(A Coruña)

OBLIGATORY SUBJECTS

SUBJECTS	(ECTS)
HYDROLOGICAL PLANNING AND PROJECTS	6
PHYSICO CHEMISTRY AND QUALITY OF WATER	6
WATER SUPPLY AND DRAINAGE SYSTEM	6

First term(A Coruña)

OPTIONAL SUBJECTS *(to choose 2out of 4)*

Subjects	(ECTS)
EXPERIMENTAL HYDRAULICS I	6
COMPUTATIONAL FLUID DYNAMICS I	6
WATER TREATMENT AND ENERGY EFFICIENCY	6
GROUNDWATER ENGINEERING I	6

First Term(A Coruña)

WATER TREATMENT AND ENERGY EFFICIENCY

To identify and assess risk factors and processes involved in water pollution and water treatment

PROFESSORS	DEPARTAMENT BELONG TO THE CENTER OF:
Ana Mª Vázquez González	Civil Engineering School
Margarita Martínez Díaz	Civil Engineering School
Maria José Servia Garcia	Faculty of Sciences

First Term(A Coruña)

HYDROLOGICAL PLANNING AND PROJECTS

Assessment and analysis of water resources systems

Management of surface and groundwater

The extraction of water and its uses

Methods of analysis: identification, optimization, uncertainties, objectives and control of water management plans

Introduction to data management systems GIS

Design and planning of water resources systems

PROFESSORS	DEPARTAMENT BELONGING TO THE CENTER OF:
Acacia Naves García-Rendueles	Civil Engineering School
Juan Román Acinas García	Civil Engineering School
Francisco Padilla Benítez	Civil Engineering School

First Term(A Coruña)

EXPERIMENTAL HYDRAULICS I

Introduction to experimental hydraulics.

Know and understand the design and construction of scale models of hydraulic structures.

Understand the different techniques of measurements of the physical conditions in the field of hydraulics.

Instrumentation and process control water treatment

PROFESSORS	DEPARTAMENT BELONGINGING TO THE CENTER OF:
Juan Rabuñal Dopico	Faculty of informatic
Ana María Vázquez González	Civil Engineering School

First Term(A Coruña)

PHYSICO CHEMISTRY AND QUALITY OF WATER

Basic principles of water chemistry.

Sampling procedures and design field campaigns. analytical tools for the identification and measurement of chemical components of water and polluting techniques.

Evaluation of the quality of the analytical data.

Data analysis and interpretation

PROFESSORS	DEPARTAMENT BELONGING TO THE CENTER OF
Ana María Vázquez González	Civil Engineering School
Jordi Delgado Martín	Civil Engineering School

First Term (A Coruña)

WATER SUPPLY AND DRAINAGE SYSTEM

Historical introduction to water supply and sanitation systems

Collection systems and water purification treatments

Distribution networks: general concepts, description and design.

Sanitation networks: general concepts, description and design.

Sustainable drainage systems

Wastewater treatment prior to discharge to the receiving environment

Legal framework

PROFESSORS	DEPARTAMENT BELONGING TO THE CENTER OF
Acacia Naves Garcia-Rendueles	Civil Engineering School
Pablo Rodríguez Vellando	Civil Engineering School
Cristina Mercedes Vázquez Herrero	Civil Engineering School
Francisco Javier Sanz Larruga	Faculty of Laws
Alberto Martínez López	Faculty of Economics

First Term (A Coruña)

GROUNDWATER ENGINEERING I

Groundwater flow in porous and fractured conditions in saturated and unsaturated media

Interaction surface and underground water.

Principles of hydrochemistry and water-rock interaction (chemical hydrogeology, transport in porous media)

Hydrodynamic tests in aquifers (pulse tests, pumping tests)

Constructive aspects of wells, development and exploitation of aquifers

PROFESSORS	DEPARTAMENT BELONGING TO THE CENTER OF
Ricardo Juncosa Rivera	Civil Engineering School
Gemma Soriano Hoyuelos	Civil Engineering School
Francisco Padilla Benítez	Civil Engineering School

First Term (A Coruña)

COMPUTATIONAL FLUID DYNAMICS I

Fundamentals of open channel flow and computational fluid dynamics.

Basic equations: Saint-Venant, Navier-Stokes, potential flow, vorticity-stream, Stokes flow, water, convection-diffusion, Darcy, ...

Matlab basics of programming

Finite element programming hydrodynamics, porous media and geochemical models.

Introduction finite volume

PROFESSORS	DEPARTAMENT BELONGING TO THE CENTER OF
Pablo Rodriguez Vellando	Civil Engineering School
Jaime Fe Marqués	Civil Engineering School
Acacia Naves Garcia-Rendueles	Civil Engineering School

Second Term (Magdeburg)

1st of April to 30th of July 2016 – 30 Julio 2017

Place: University of Applied Science–Magdeburg– Germany

Departament of the Water and Waste Management

Second Term (Magdeburg)

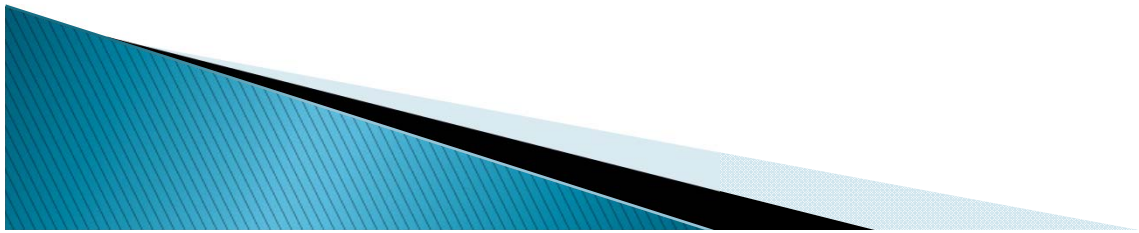
OBLIGATORY SUBJECTS

SUBJECTS	ECTS
HYDRAULIC PLANNING AND PROJECTS	6
RESTORATION ECOLOGY	6
GIS AND HYDROLOGY	6

Second Term (Magdeburg)

OPTIONAL SUBJECTS *(to choose 2 out of 4)*

SUBJECTS	ECTS
EXPERIMENTAL HYDRAULICS II	6
COMPUTATIONAL FLUID DYNAMICS II	6
RIVER MORPHOLOGY	6
ENVIRONMENTAL BIOTECHNOLOGY	6



Second Term (Magdeburg)

HYDRAULIC PLANNING AND PROJECTS

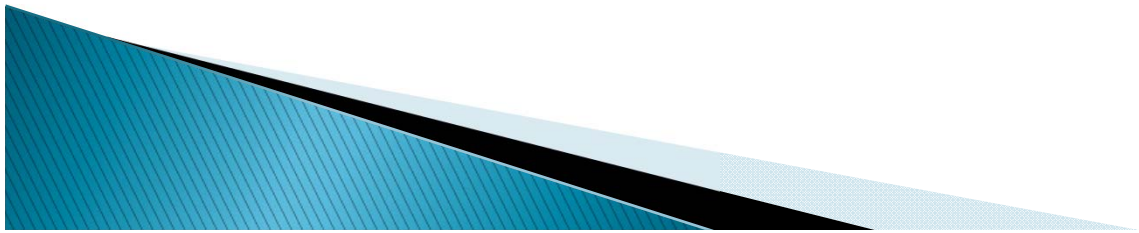
Hydraulic design of dams and weirs in international projects

Flood control and regulation

Hydraulics porous medium

Hydraulic channel

Hydraulic and design of fishways



Second Term (Magdeburg)

GIS AND HYDROLOGY

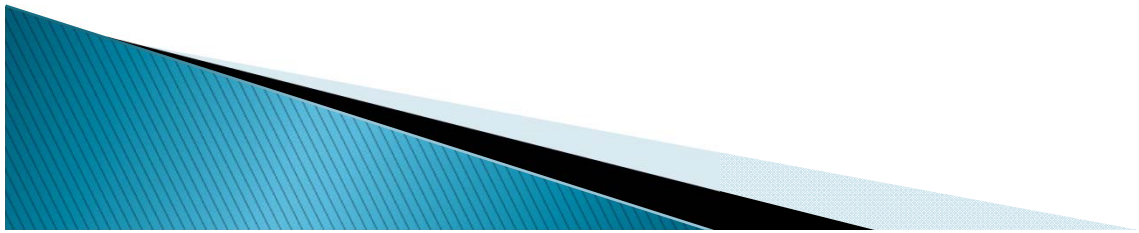
advanced hydrology

Analysis of extreme, PMP, PDF

Climate change

numerical models

Application of GIS projects, hydrogeology



Second Term (Magdeburg)

RESTORATION ECOLOGY

Ecology of rivers and lakes

Design of experiments in ecology

Fundamentals of river restoration

Examples and field

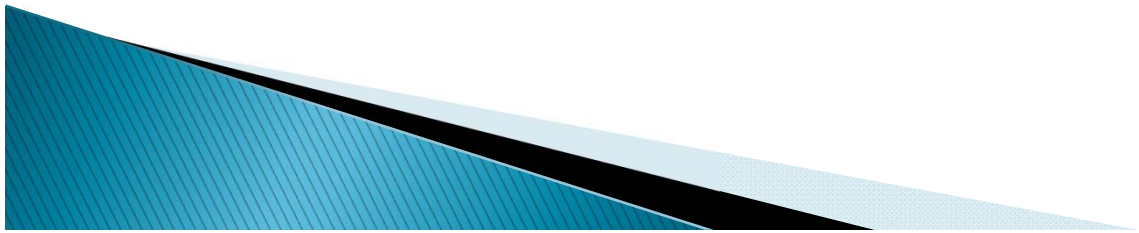
Second Term (Magdeburg)

EXPERIMENTAL HYDRAULICS II

Hydraulic flow channels experiments with and without morphological alterations: scaling laws, measurement systems, data acquisition and analysis

Recircling sediment, sediment transport

Phenomena in hydraulic structures entrainment



Second Term (Magdeburg)

COMPUTATIONAL FLUID DYNAMICS II

Using HEC-RAS in combination with GEO HEC RAS

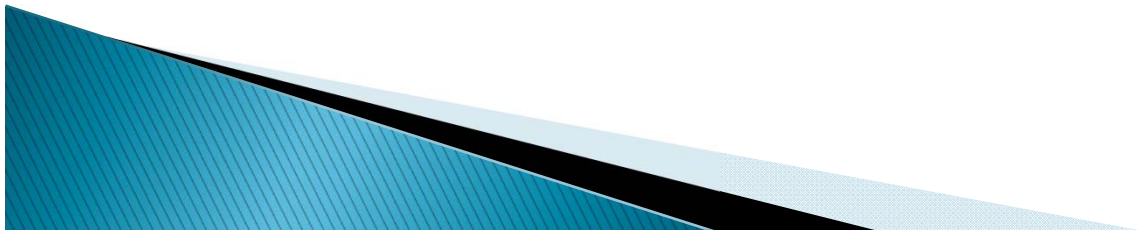
Advanced hydraulic projects

Transport and silting

2D hydraulic models

Advantages and disadvantages of 1D and 2D models

SSIM models3



Second Term (Magdeburg)

RIVER MORPHOLOGY

Fundamentals of river morphology

Using diagrams Shields and Hjulström

Sediment transport

Bed load and suspended load

Drag in hydraulic structures

Sedimentation in reservoirs

Recirculation sediments

Second Term (Magdeburg)

ENVIRONMENTAL BIOTECHNOLOGY

Biodiversity and species composition analysis

Determination of aquatic organisms

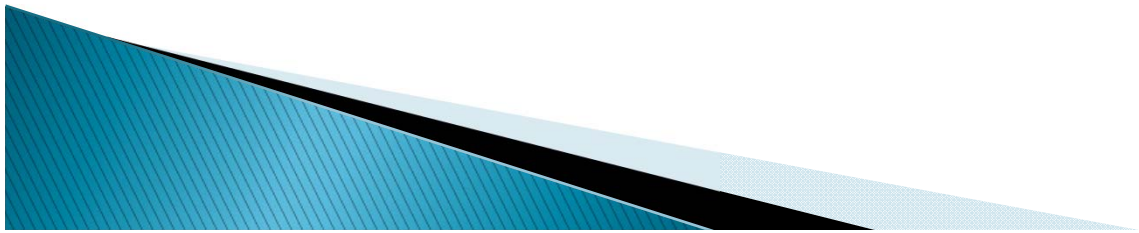
Hydro-biological field studies and analysis

Water chemistry

Water pollution

Water protection

Environmental microbiology



Third Term

Subject	ECTS
Training Period	15
Final Master Work	15

Third Term
Final Master Work

Place to present the FMW

- University of Magdeburg
- University of A Coruña

Convocatories:

- March
- *July*
- September

10 weeks minimum must pass between the completion of 10 weeks of practice and defence of the TFM

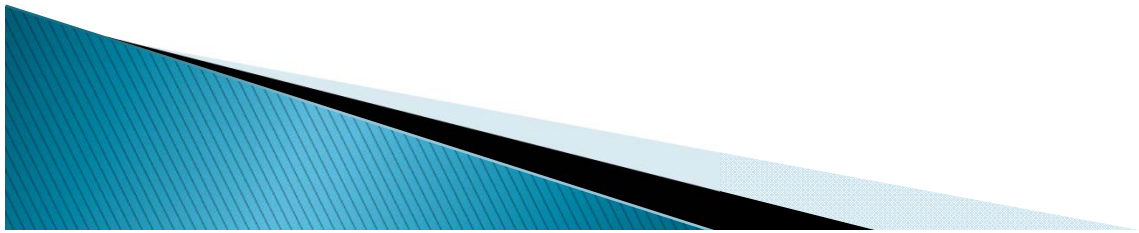
15 ECTS

Third Term
Training Period

- Time period: between 10 weeks and 6 months
- 15 ECTS

It takes place in any of the companies or partner universities, the student's choice (on selection through CV student of that company or university).

COMPANIES WITH AGREEMENT TO DO THE TRAINING PERIOD



2013/2014
SGS Tecnos S.A.
Empresa Municipal de Aguas de La Coruña , S.A
AQUAGEST
Puerto de Ferrol
ETS Ingeniería Industrial
Acciona
Consultora de Ingeniería, Meioambiente y Arquitectura SL - CIMARQ
Universidad de Alicante
Universidad de San Diego, California
École polytechnique fédérale de Lausanne -EPFL
Dipartimento di Elettronica, Informazione e Bioingegneria Politecnico di Milano
LWI: Leichtweiss Institute for Hydraulic Engineering and Water Resources
University of Magdeburg Hochsule
INRS: Institut National de la Recherche Scientifique. Quebec .
GGU Gesellschaft für Grundban und Umwelttechnique
INROS-LACKNER Rostock
University of Genova
UFZ Helmholtz Centre for Environmental Research
BBFZ

2014/2015
ENDESA GENERACIÓN S.A
Empresa Mixta de Augas de Ferrol S.A EMAFESA
Empresa Municipal de Aguas de La Coruña, S.A
Consultora de Ingeniería, Meioambiente y Arquitectura SL - CIMARQ
ASTURAGUA
VIAQUA Gestión Integral de Aguas de Galicia S.A
Norwegian University of Science and Technology (NTNU)
Solimno Tec GmbH+Co.KG
University de Magdeburg Hochsule
Universidad de Hoguin (Cuba)
INRS: Institut National de la Recherche Scientifique. Quebec
Fichtner Water and Trasnportation GmbH
Deutsches Biomasseforschungszentrum- DBFZ
UFZ Helmholtz Centre for Environmental Research

2015/2016

Universidad de Magdeburg Hochsule

VIAQUA Gestión Integral de Aguas de Galicia S.A

Empresa mixta de augas de Ferrol S.A

Aquaourense

Adantia

Spina y delfin

OHL

Aquatica

Grupo Puentes

Aguas de Alicante

Spina y delfin

SGS

Empresa Municipal de Aguas de La Coruña , S.A

Ayuntamiento de Ávila/Aqualia

Adantia

Universidad de Magdeburg Hochsule

2016/2017

VIAQUA Gestión Integral de Aguas de Galicia S.A

Institulo Eula, Chile

Aguas de Valladolid

BBFZ

Antea Group, Bélgica

CH2M, Madrid

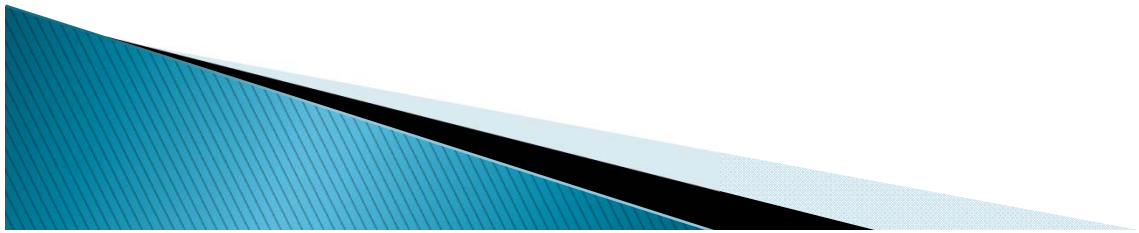
Terravanza

Adantia

Aquona

Empresa Municipal de Aguas de La Coruña , S.A

Universidad de Magdeburg Hochsule



2017/2018

VIAQUA Gestión Integral de Aguas de Galicia S.A

Ggu mbH

wasserwirtschaftsamt traunstein

Ministerium für Umwelt, Landwirtschaft und Energie

Betriebsgesellschaft mbh

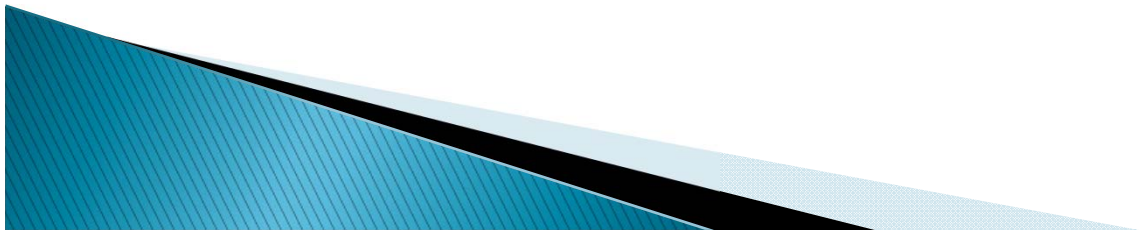
Helmholtz Centre for Environmental Research - UFZ

Universidad de Magdeburg Hochsule

Admission

Students may be admitted to the Master according to the specific requirements and criteria for evaluating merits in the case of the Master in Water Engineering, they will be regulated by a five-teachers commission appointed by the director of the School of Civil Engineering by the proposal of the Coordinator of the Master. The Coordinator will be among its members and act as chairman.

The admission criteria will be strictly academic and comply with the rules on access to the master's degrees from both universities, in particular to those specified in the Royal Decree 1393/2007 of 29 October.



Admission

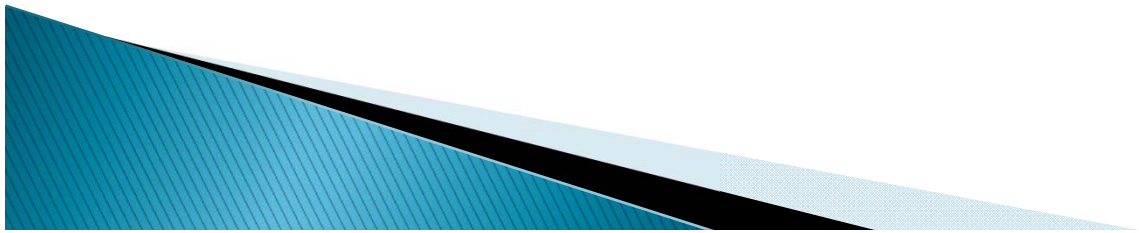
Being in possession of a Spanish degree or another degree issued by an institution of higher education in the European Higher Education Area empowering in the country issuing the qualification for admission to master's degree university degree.

Admission

The recommended entry profile that is set for admission to the master is to be in possession of a degree in some form of engineering.

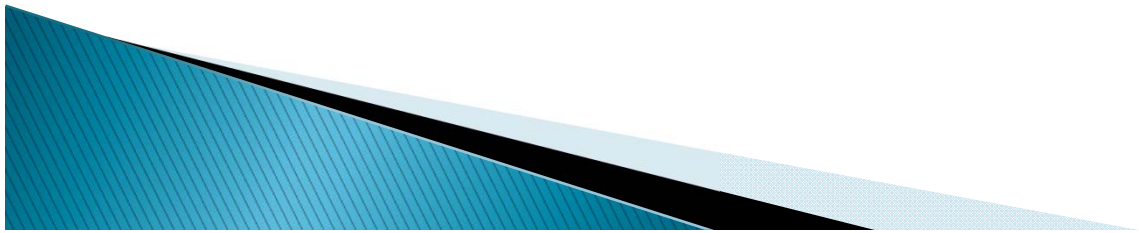
Preference will be given to graduates in the field of Civil Engineering.

If the degree of access is in another engineering but not the branch of Civil Engineering, the candidate must demonstrate that they have passed (or possibly be prepared to take and pass simultaneously) minimum credits in the area of Hydraulics and Hydrology (6c) and college-level Environmental Engineering (6c).



Admission

Access from degrees of scientific disciplines (Chemistry, Biology, Geology, Environmental Science, ...), in this case, besides the requirements above minimum credits, candidates must have passed, or be willing to attend also be allowed simultaneous and to pass minimum credits in the following disciplines: Mathematics (10c) and Fluid Mechanics and Physics (6c) at university level..



Admission

In order to study these complementary subjects simultaneously, the University of A Coruña gives all possible facilities within the catalogue of subjects currently taught in the School of Civil Engineering

Admission

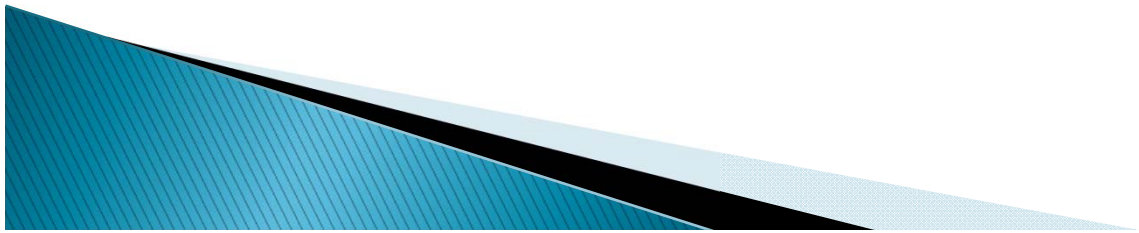
- Average mark of the academic record (maximum 10 points)
- Affinity Factor according to degree of access :
  - Civil engineering: 2 points
  - Other engineering: 1.5 points
  - scientific careers: 1 point
  - Arts: 0
  - Duration of the degree of access

    6 years : 6 points

    5 years: 5 points

    4 years: 4 points

    3 years: 3 points



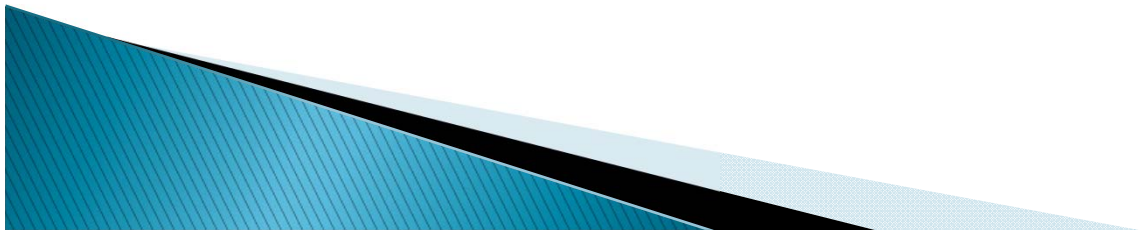
Admission

Total number of places: 25

13 for students enrolled at the UDC

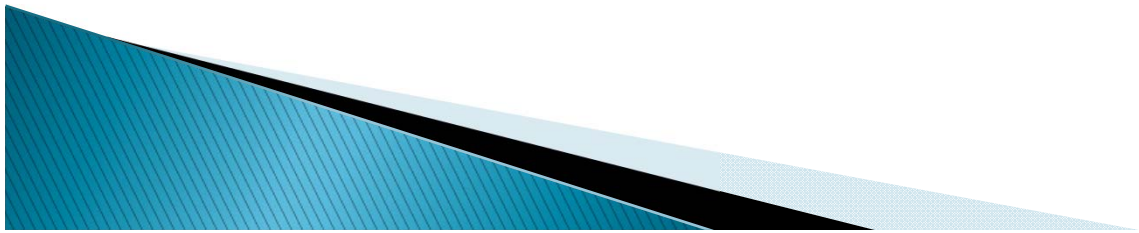
12 for students enrolled at the University of Magdeburg

If the number of places available for those enrolled in the University of Magdeburg are not met, students from the waiting list of the UDC pass to cover such places



REGISTRATION PERIOD

FOR THE COURSE 2018/2019



REGISTRATION PERIOD

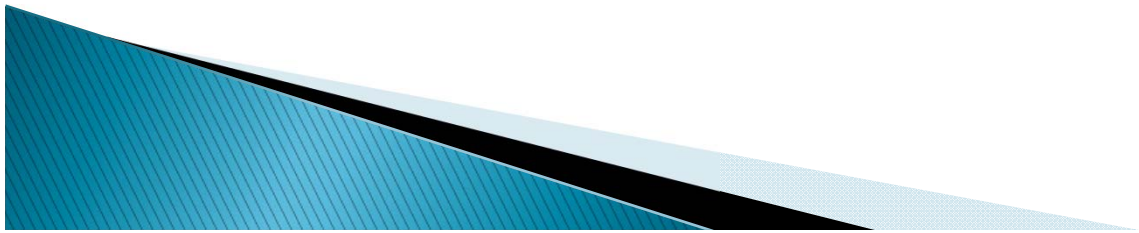
16th of January to 30th of April 2018	Pre- enrollment period
8th to 10th of May 2018	Provisional list
10th of May to 18th of May 2018	Claims period
24th of May to 25th of May 2018	Final List

Prices

The fees for the master are the same in all of the official masters in the universities of the Galician Community, because they are fixed by the Galician Government

The fees for the master for students registered in the University of A Coruña, are the following:

- For European students:



Prices

First course:

- 31.36€ each ECT (complete course 60ECTS)
- 37,10€ for administration costs divided into:
  - opening of academic record=22.31€
  - university card = 4.79€
  - school insurance= 1,12€ (10€ if the student is older than 28)
- Mobility insurance =125€

so, the total price for the first course is:

31.36*60+22,31+4,79+10+125=2043,70€

Prices

Second Course:

31.36€ each ECT (complete course 30ECTS)

- University card = 4.79€
- School insurance= 1,12€ (10€ if the student is older than 28)

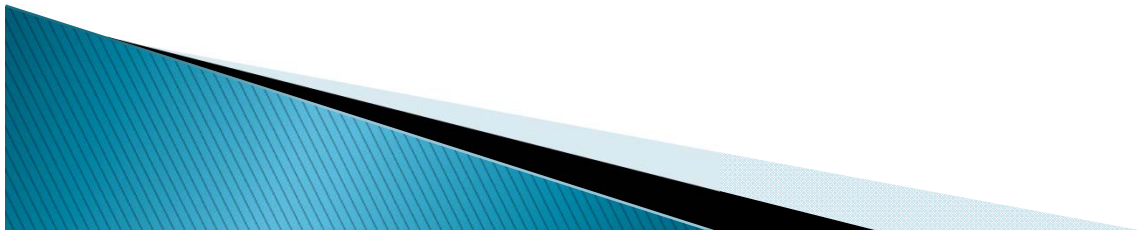
The total price for the second course is: 31.36*30+4.79+10=

955,59 €

Mobility insurance=125€ (if the student courses the training period outside from Spain)

The students have to pay about 105€ for administration costs in the University of Magdburg in all of the terms

- For other students :



Prices

First course:

- 58,02 € each ECT (complete course 60ECTS)
- 162,10€ for administration costs divided into:
  - opening of academic record=22,31€
  - university card = 4,79€
  - school insurance= 10€
- Mobility insurance=125€

so, the total price for the first course you will be:

58,02*60+22.31+4.79+10+125=3643,3€

Prices

Second Course:

31,36€ each ECT (complete course 30ECTS)

- University card = 4.79€
- School insurance= 10€

The total price for the second course you will be:

31,36*30+4.79+10= 955,59€

Mobility insurance=125€ (if the student courses the training period outside from Spain)

The students have to pay about 105€ for administration costs in the University of Magdburg in all of the terms

Grants

-Santander Bank:

With this kind of grant, the students could receive the public price of the credit multiplied by total amount of the credits registered. That means, that the grant will not cover the full amount of the costs for the first course, but the grant will cover the most of the total amount for the second course because the student will get the residence permit and he will be registered as spanish student.

The student will have to advance the registration fees, because the scholarship is granted on February

Information

http://caminos2.udc.es/hosting/masteragua/

https://www.globalwaterjobs.com/Education/masterwaterengineering.html

http://estudos.udc.es/es/study/start/4444V02

http://caminos.udc.es/info/asignaturas/201/masterindex.html