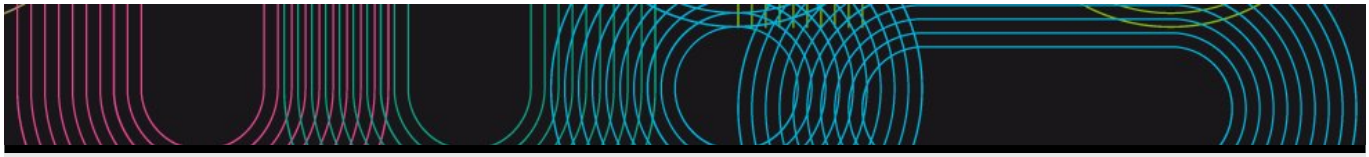

IDENTIFYING DATA				
Forestry Hydrology				
Subject	Forestry Hydrology			
Code	P03G370V01604			
Study programme	(*)Grao en Enxeñaría Forestal			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	3rd	2nd
Teaching language	Spanish			
Department				
Coordinator	Bartolome Mier, Javier			
Lecturers	Bartolome Mier, Javier			
E-mail	jbartolome@uvigo.es			
Web	http://http://www.forestales.uvigo.es/			
General description	Description of the elements that influence in the hydrological cycle. Characterisation of hydrographic basins and quantification of the erosion. Technicians of control and management of the hydrographic basins			

Competencies	
Code	
A19	(*)CG-15: restauración hidrolóxico forestal.
A62	(*)CE-09: Capacidade para coñecer, comprender e utilizar os principios de: hidráulica forestal; hidroloxía e restauración hidrolóxico-forestal.

Learning aims	
Expected results from this subject	Training and Learning Results
Knowing the main characteristics of hydrologic cycle , understanding and skilled in the methods of assessment precipitation evaporation , infiltration and runoff at water basin forest	A62
Meet the role played by forest vegetation in the regulation of hydrological regime	A62
Acquire skills in the methods of determination of flow runoff hydrograph forest watersheds	A62
Acquire skills in determining the physical characteristics of catchment	A62
Acquire knowledge and skill of climate and hydrological data and its application to real case	A62
Knowing the essential characteristics of the erosion process and skilled in the use of mitigation techniques	A62
Acquiring knowledge about programs water erosion assessment and its application to real cases	A62
Knowledge of the techniques of assessment of the ecological status of rivers as well as the planning and execution of tasks of ecological restoration of rivers and riverbanks	A62
Knowledge and skill acquisition in the tasks of planning and execution of transverse and longitudinal channels in hydrologic works in degraded areas	A62
Capacity to tackle projects of forest hydrological restoration of basins, knowing the distinct hydrotechnics typologies	A19

Contents	
Topic	
Subject1 Introduction and generalities	Hydrological cycle. The hydrological basin. Physical parameters of the basin. Soil and climate. Actions of the forest on the water regulation. Hydrological subsystems. Hydrological models. legal framework .

Subject 2 Precipitation	Training and types. Measured atmospheric humidity. Terminal Speed drops rain. Size drops and kinetical energy. Measure and distribution of the precipitation. Methods of work with rainfall data. Half precipitation on an area
Subject 3 Evaporation	Solar radiation Profiles of wind in vegetation Evaporation and evapotranspiration Empirical methods Interception and transpiration in forests
Subject 4 Infiltration	Measure of humidity and potential water in the floor influential Factors instantaneous and accumulated Infiltration Flow in saturated means. Law of Darcy Models of infiltration Measured of the hydraulic conductivity
Subject 5 Runoff	Generation and classification of the flow of runoff Coefficient of runoff. Number Of Curve Methods of Green-Ampt Methods of estimate of runoff monthly Water balance and Thornthwaite
Subject 6 Hydrographs	Separation of basic flow Unitary and synthetic hydrographs Maximum Discharge of runoff
Subject 7 Surface water and groundwater	Aquifers hydrogeological variables Equations of subterranean flow
Subject 8 hydrological Measurements	Discharge Measurements of speed of flow Measurements with sensors of pressure Types of control of relation level and discharge
Subject 9 Driving of avenues of water	Introduction Traffic of aggregated systems hydrological Traffic in rivers Traffic distributed of increasing cinematic Wave
Subject 10 hydrological Statistics	Concepts. Analysis of frequency. Work of distribution. Period of return. Theory of adjust statistical. Analysis of frequency for extreme values .
Subject 11 hydrological Restoration forest	Action of the forest on water regulation. Distribution of the the precipitation in forest masses. Intercept. Translocation. Trunk runoff Hydrological techniques reforestation
Subject 12: Water erosion	Types of erosion. Parametric models Models of analytical solution . Stabilization and rehabilitation techniquesn of areas with risk of erosion
Subject 13: Restoration of banks and rivers	Main pressures and impacts of the Spanish rivers Environmental Assessment of the rivers Features and banks Performances for the improvement and restoration of rivers Development projects Ecological restoration of rivers and banks
Subject 14: transversal Works in the course	Dams of consolidation Dams of retention Planning and technical criteria of execution Act longitudinal in margines rivers Design of breakwaters Pavers background Deflectors

Planning

	Class hours	Hours outside the classroom	Total hours
Practice in computer rooms	10	10	20
Autonomous troubleshooting and / or exercises	30	30	60
Outdoor study / field practices	3	3	6
Master Session	30	30	60
Troubleshooting and / or exercises	3	0	3
Short answer tests	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

	Description
Practice in computer rooms	I handle of software draw computer-aided for treatment of watershed. By means of this methodology develop the competitions A19 and A62
Autonomous troubleshooting and / or exercises	They will explain and/or they will resolve problems in group from a series of billed facilitated by the professor. The students will have to resolve a small number of exercises for each one of the subjects, that will have to deliver in the term indicated for his qualification. By means of this methodology develop the competitions A19 and A62
Outdoor study / field practices	It will realise visit to a place of interest hydrological to observe the hydrological conditions of the same and infrastructures and techniques of restoration employed. By means of this methodology develop the competitions A19 and A62
Master Session	Classes in the classroom to the groups, where explain the corresponding contents to each subject. By means of this methodology develop the competitions A19 and A62

Personalized attention

Methodologies	Description
Autonomous troubleshooting and / or exercises	Doubts that arise in solving the exercises are will supervise

Assessment

	Description	Qualification
Troubleshooting and / or exercises	Practical supposition for his resolution. By means of this methodology evaluate the competitions A19 and A62	30
Short answer tests	Proof with questions type test and of short answer, where the student will have to show the knowledge purchased. By means of this methodology evaluate the competitions A19 and A62	70

Other comments on the Evaluation

Sources of information

LOPEZ CHAINS, *F. ---Hydrological restoration-forest of basins and control of erosion.*Tragsa-*Tragsatec/Mº. Environment/ *Mundi-Press, 948 *pp., 2ª*ed., 1998,

LOPEZ CHAINS, *F. ---The *Ingenieria of the processes *dedesertificación : *Mundi Press 2003. *pags 1045

FLAMES *J. *Hidrologia General. Publishing service of the University of the *Pais Basque. 1993 *pags 635

*DAL-*RE *R ET AL . 2003 Small *embalses of use *agricola. *Mundi Press

*NANIA L. And *GOMEZ M . 2006.*Ingenieria *hidrologica . Publisher *Bellisco . *pags 280

MARTIN *VIDE *J. *P. *IngenieriaFluvial . 2003. *pags 230

MARTIN *VIDE *J. *P. *Ingenieria Of *losrios . 2006

MARTINEZ And. 2001. *Hidraulicafluvial . Publisher *Bellisco . *pags 425. Ministry of Agriculture and Environment *MAGRAMA. 2012 Manual *detecnicas of fluvial restoration . *pags 300

*CHOW,V.*T., D.*R. *MAIDMENT And L.*W. *MAYS: *Applied *Hydrology. *McGRAW-*HILL, 1988 (Spanish Translation:Hydrology applied).

GARCÍA OF JALÓN *LASTRA And OTHERS --- Principles and techniques of management of the fishing in continental waters. *Mundi-Press 1993

Recommendations