



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				
Department				
Coordinator	Álvarez Bermúdez, Xana			
Lecturers	Álvarez Bermúdez, Xana			
E-mail	xana.alvarez.bermudez@gmail.com			
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	
B3	Knowledge of degradation processes that affect forest systems and resources (pollution, pests and diseases, fires, etc.) and capacity for the use of forest environment protection techniques, forest hydrological restoration and biodiversity conservation .
C9	Ability to know, understand and use the principles of: forestry hydraulics; hydrology and hydrological-forest restoration.
D4	Sustainability and environmental commitment

Learning outcomes

Expected results from this subject	Training and Learning Results
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- 2R. 2018 Knowledge and understanding of the disciplines of engineering of the his speciality, to the necessary level to purchase the rest of the competitions of the qualifications, including notions of the last advances. B3 C9 D4
- 3R. 2018 Be conscious of the multidisciplinary context of the engineering.
- 5R. 2018 Capacity to identify, formulate and resolve problems of engineering in the his speciality; choose and apply analytical methods, of calculation and experiments properly established; Recognize the importance of the social restrictions, of health and security, environmental, economic and industrial.
- 6R. 2018 Capacity to project, design and develop complex products (pieces, component, products finished, etc.), processes and systems of the his speciality, that fulfil the requirements established, including the knowledge of the social aspects, of health and environmental security, economic and industrial; as well as select and apply methods of appropriate project.
- 7R. 2018 Capacity of the project using any knowledges advanced of the his speciality in engineering.
- 8R. 2018 Capacity to realize bibliographic researches, consult and use databases and other sources of information with discretion, to realize @simulación and analysis with the objective to realize investigations on technical subjects of the his speciality.
- 12R. 2018 practical Competition to resolve complex problems, realize complex projects of engineering and realize specific investigations stop his speciality.
- 14R. 2018 Capacity to apply norms of engineering in the his speciality.
- 15R. 2018 Knowledge of the social implications, of health and security, environmental, economic and @industrial of the practice in engineering.
- 16R. 2018 general Ideas on economic questions, organisational and of management (how management of projects, management of risks and change) in the industrial and entrepreneurial context.
- 17R. 2018 Capacity to collect and interpret data and handle complex concepts inside the his speciality, to issue judgements that involve a reflection on ethical and social questions
- 18R. 2018 Capacity to manage activities or technical projects or complex professionals of the his speciality, assuming the responsibility of the takes of decisions.

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
Subject 15: practical sessions	Hydrological modeling with HEC-HMS. Configuration of projects in HEC-HMS and its capabilities for basin modeling through the introduction of the different components of the basin, as well as the meteorological model and control specifications. Direct runoff hydrograph calculation produced by a precipitation event and analysis of results.

Planning

	Class hours	Hours outside the classroom	Total hours
Practices through ICT	10	10	20
Autonomous problem solving	30	30	60
Studies excursion	3	3	6
Lecturing	30	30	60
Problem and/or exercise solving	3	0	3
Problem and/or exercise solving	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
Practices through ICT	I handle of software draw computer-aided for treatment of watershed. By means of this methodology develop the competitions A19 and A62

Autonomous problem solving	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
Studies excursion	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
Lecturing	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 assistance

Methodologies	Description
Autonomous problem solving	

Assessment

	Description	Qualification	Training and Learning Results
Problem and/or exercise solving	Practical supposition for his resolution. By means of this methodology evaluate the competitions A19 and A62	30	C9
Problem and/or exercise solving	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	C9

Other comments on the Evaluation

Sources of information

Basic Bibliography

Complementary Bibliography

Recommendations

Contingency plan

Description

=== EXCEPTIONAL MEASURES SCHEDULED ===

In front of the uncertain and unpredictable evolution of the sanitary alert caused by the *COVID-19, the University of Vigo establishes an extraordinary planning that will activate in the moment in that the administrations and the own institution determine it attending to criteria of security, health and responsibility, and guaranteeing the teaching in a no face-to-face stage or partially face-to-face. These already scheduled measures guarantee, in the moment that was prescriptive, the development of the teaching of a more agile and effective way when being known in advance (or with a wide *antelación) by the students and the *profesorado through the tool normalised and institutionalised of the educational guides.

=== ADAPTATION OF THE METHODOLOGIES ===

* educational Methodologies that keep : all

* educational Methodologies that modify : it will change from the face-to-face modality to the on-line modality through the virtual campus of the university of Vigo.

* Mechanism no face-to-face of attention to the students (*tutorías): through the email and of the virtual dispatch of the professor

* Modifications (if they proceed) of the contents to give: without modification

* additional Bibliography to facilitate the car-learning: without modification

* Other modifications

=== ADAPTATION OF THE EVALUATION ===

* Test already made: they keep

Proof XX: [previous Weight 00%] [Weight Proposed 00%]

...

* Pending proofs that keep : they keep

Proof XX: [previous Weight 00%] [Weight Proposed 00%]

...

* Proofs that modify : without modification. They will become on-line examinations if the circumstances do not allow face-to-face examinations

[previous Proof] > [new Proof]

* New test

* additional Information
