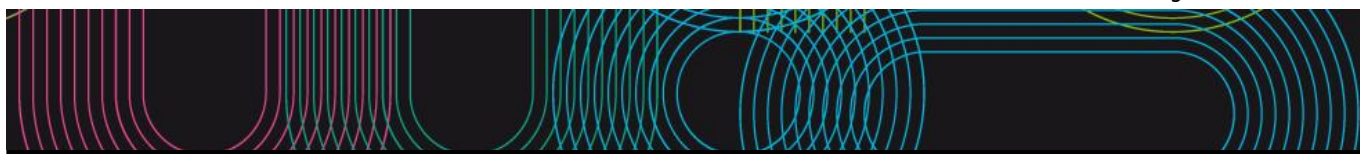




TABLA DE ERROS	
Lugar do erro	Descrición
Apartado de titulación 'Address'	Erro de PHP [Warning, script: /var/www/releases/docnet/docnet-20190611-122652/vendor/mpdf/mpdf/src/Image/ImageProcessor.php, liña: 223]: fopen(https://seix.uvigo.es/docnet_2.2/docencia/admin/fitxer.php?carpeta=fotos_ensenyaments&fitxer=32&nom_any_academic=2010_11) [function.fopen0]: failed to open stream: HTTP request failed! HTTP/1.1 404 Not Found
Apartado de titulación 'Address'	Erro de PHP [Warning, script: /var/www/releases/docnet/docnet-20190611-122652/vendor/mpdf/mpdf/src/Image/ImageProcessor.php, liña: 231]: fopen(https://seix.uvigo.es/docnet_2.2/docencia/admin/fitxer.php?carpeta=fotos_ensenyaments&fitxer=32&nom_any_academic=2010_11) [function.fopen0]: failed to open stream: HTTP request failed! HTTP/1.1 404 Not Found
Apartado de titulación 'Address'	Erro de PHP [Warning, script: /var/www/releases/docnet/docnet-20190611-122652/vendor/mpdf/mpdf/src/Image/ImageProcessor.php, liña: 223]: fopen(https://seix.uvigo.es/docnet_2.2/docencia/admin/fitxer.php?carpeta=fotos_ensenyaments&fitxer=31&nom_any_academic=2010_11) [function.fopen0]: failed to open stream: HTTP request failed! HTTP/1.1 404 Not Found
Apartado de titulación 'Address'	Erro de PHP [Warning, script: /var/www/releases/docnet/docnet-20190611-122652/vendor/mpdf/mpdf/src/Image/ImageProcessor.php, liña: 231]: fopen(https://seix.uvigo.es/docnet_2.2/docencia/admin/fitxer.php?carpeta=fotos_ensenyaments&fitxer=31&nom_any_academic=2010_11) [function.fopen0]: failed to open stream: HTTP request failed! HTTP/1.1 404 Not Found
Apartado de titulación 'Additional information'	Erro de PHP [Warning, script: /var/www/releases/docnet/docnet-20190611-122652/vendor/mpdf/mpdf/src/Image/ImageProcessor.php, liña: 223]: fopen(https://seix.uvigo.es/docnet_2.2/docencia/admin/fitxer.php?carpeta=fotos_ensenyaments&fitxer=36&nom_any_academic=2010_11) [function.fopen0]: failed to open stream: HTTP request failed! HTTP/1.1 404 Not Found
Apartado de titulación 'Additional information'	Erro de PHP [Warning, script: /var/www/releases/docnet/docnet-20190611-122652/vendor/mpdf/mpdf/src/Image/ImageProcessor.php, liña: 231]: fopen(https://seix.uvigo.es/docnet_2.2/docencia/admin/fitxer.php?carpeta=fotos_ensenyaments&fitxer=36&nom_any_academic=2010_11) [function.fopen0]: failed to open stream: HTTP request failed! HTTP/1.1 404 Not Found
Apartado de titulación 'Additional information'	Erro de PHP [Warning, script: /var/www/releases/docnet/docnet-20190611-122652/vendor/mpdf/mpdf/src/Image/ImageProcessor.php, liña: 223]: fopen(https://seix.uvigo.es/docnet_2.2/docencia/admin/fitxer.php?carpeta=fotos_ensenyaments&fitxer=34&nom_any_academic=2010_11) [function.fopen0]: failed to open stream: HTTP request failed! HTTP/1.1 404 Not Found
Apartado de titulación 'Additional information'	Erro de PHP [Warning, script: /var/www/releases/docnet/docnet-20190611-122652/vendor/mpdf/mpdf/src/Image/ImageProcessor.php, liña: 231]: fopen(https://seix.uvigo.es/docnet_2.2/docencia/admin/fitxer.php?carpeta=fotos_ensenyaments&fitxer=34&nom_any_academic=2010_11) [function.fopen0]: failed to open stream: HTTP request failed! HTTP/1.1 404 Not Found
Apartado de titulación 'Additional information'	Erro de PHP [Warning, script: /var/www/releases/docnet/docnet-20190611-122652/vendor/mpdf/mpdf/src/Image/ImageProcessor.php, liña: 223]: fopen(https://seix.uvigo.es/docnet_2.2/docencia/admin/fitxer.php?carpeta=fotos_ensenyaments&fitxer=33&nom_any_academic=2010_11) [function.fopen0]: failed to open stream: HTTP request failed! HTTP/1.1 404 Not Found
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(*)Escola de Enxeñaría Forestal

Presentation

Welcome to the Forestry Faculty (Campus of Pontevedra - University of Vigo). Details information about our faculty can be found in <http://www.forestales.uvigo.es>

Our faculty offers the Degree in Forest Engineering

The Degree comprises 240 credits ECTS during four years, meaning an annual distribution of 60 ECTS distributed in 30 ECTS per semester.

Address

1. Name: Forestry Technical School
2. Degree: Degree in Forestry
3. Postal address: Campus A Xunqueira, 36005 Pontevedra
4. Telephone: 986-801900
5. FAX: 986-801907
6. And-mail: sdeutf@uvigo.es
7. Web: <http://www.forestales.uvigo.es>



Faculty Management

Managerial team:

Director: D. Enrique Valero Gutiérrez del Olmo

Deputy director: D^a. Angeles Cancela Carral

Secretary: D. Juan Picos Martín

Governing bodies:

- Faculty Assembly

- Commissions:

- Permanent
- Economic Affairs
- Academic Affairs
- Credit Validation
- Quality

Departments in the Centre:

(*)Servizo e Infraestructuras do Centro

- (*)
1. Administración: o horario de atención ao público de secretaría é de 9:00 a 14:00 horas.
 2. Bibliotecas: http://www.uvigo.es/uvigo_gl/Administracion/Biblioteca/directorio/campus_pontevedra.html
 3. Conserxaría: A conserxaría do Centro permanece aberta desde a apertura ao peche do Centro, en dúas quendas: 8:00 a 15:00 horas, e 15:00 a 22:00.
 4. Reprografía: Este servizo atópase na Facultade de CC. Sociais e cobre as necesidades do Campus.
 5. Cafetería
 6. Administrador de Centros
 7. Área de Servizos á Comunidade
 8. Rexistro
 9. LERD
 10. Bolsas
 11. CAP
 12. OSIX

Aulas e laboratorios:

Aulas docentes:

AULA	Nº DE POSTOS TOTAIS	Nº DE POSTOS EN DISPOSICIÓN DE EXAME
1	65	35
2	65	35
3	65	35
4	98	53
5	104	56
6	104	56
7	104	56
8	104	56
9	104	56
SUMA	813	438

Laboratorios e talleres:

ANDAR	LABORATORIO	DOCENTE		INVEST.	
		Superficie	Capacidad Persoas	Superficie	Capac. Persoas
Soto	Lab. Hidráulica e Hidroloxía Forestal	115,83 m ²	16	35,67 m ²	3
Soto	Lab. Enxeñería Mecánica /Lab. Termotecnia	110,17 m ²	16	NO	No
Soto	Celulosa Pasta e Papel	72,04 m ²	15	35,67 m ²	3
Soto	Taller Enerxías Xiloxeneneradas	171,51 m ²	25	2º Andar	2º Andar
Soto	Taller de Madeiras	342,11 m ²	35	NO	NO
P.Baixa	Aula Informática (1)	108,85 m ²	24	NO	
P.Baixa	Aula Informática (2)	107,34 m ²	24	NO	
P.Baixa	Expresión Gráfica	168,45 m ²	48	NO	
P.Baixa	Proxectos	95,00 m ²		6	
1º	Lab. Física	112,54 m ²	16	35,67 m ²	4
1º	Lab. Ecoloxía	109,41 m ²	30	36,61 m ²	4
1º	Lab. Enxeñería do Medio Ambiente	NO	NO	34,54 m ²	4
1º	Lab. Topografía	117,57 m ²	40	36,75 m ²	2
1º	Lab. Edafoloxía	109,98 m ²	16	27,40 m ²	7
2º	Lab. Silvicultura e Repoboación	109,60 m ²	16		
2º	Lab. Enerxías Xiloxeneneradas	Soto	Soto	36,61 m ²	4
2º	Lab. Incendios Forestais	112,11 m ²	17	34,54 m ²	5
2º	Lab. Producción Vexetal	117,57 m ²	24	36,75 m ²	4
2º	Lab. de Acuicultura	112,54 m ²	pendente	NO	NO

2º	Lab. Enxeñaría Eléctrica	110,73 m ²	21	NO	NO
2º	Lab. Enxeñaría Química	109,98 m ²	15	27,40 m ²	6

Additional information

STUDENTS OFFICE:

Number tfno.: 986 801913

And-mail: daeuetf@uvigo.es



Main Regulations

Rules of interest for the students; we indicate the links where the student can find information of his interest:

Specific rules of the University of Vigo: www.uvigo.es

http://www.uvigo.es/uvigo_gl/administración/servicioalumnado

<http://extension.uvigo.es>

http://webs.uvigo.es/vicoap/normativa_oa.gl.htm

http://www.uvigo.es/uvigo_gl/estudiotitulaciones

http://www.uvigo.es/uvigo_gl/vidauniversitaria/calendarioescolar

http://www.uvigo.es/uvigo_gl/vidauniversitaria/universidadvirtual

http://secxeral.uvigo.es/secxeral_gl/normativa/normativauniversidad/estudaintes/regulamento_estudiantes.html

http://www.uvigo.es/uvigo_gl/vidauniversitaria/normativa

<http://www.forestales.uvigo.es>

Other Information

- **Study Plan:** <http://www.forestales.uvigo.es>
- **Scholarships:** <http://193.146.32.123:8080/GestorBecas/user/Becas.do?accion=tiposList>
- **Medical assistance:** http://www.uvigo.es/uvigo_gl/vidauniversitaria/salud/centromedico/
- **Employment Office :** <http://emprego.uvigo.es/>
- **Canteens and accommodation:** http://www.uvigo.es/uvigo_gl/vidauniversitaria/comedores_aloxamento/
- **Other activities:**
 - http://www.campuspontevedra.uvigo.es/index.php?*id=14 (Sports in the Campus of Pontevedra)
 - <http://deportes.uvigo.es/index.asp> (Sport Services).
 - <http://extension.uvigo.es/>

(*) Grao en Enxeñaría Forestal

Subjects

Year 2nd

Code	Name	Quadmester	Total Cr.
P03G370V01301	Matemáticas: Estadística	1st	6
P03G370V01302	Edafología	1st	6
P03G370V01303	Botánica	1st	6
P03G370V01304	Electrotecnia e electrificación rural	1st	6
P03G370V01305	Zoología e entomología forestal	1st	6
P03G370V01401	Selvicultura	2nd	6
P03G370V01402	Ecoloxía forestal	2nd	6
P03G370V01403	Topografía, teledetección e sistemas de información xeográfica	2nd	9
P03G370V01404	Hidráulica	2nd	9

IDENTIFYING DATA**Mathematics: Statistics**

Subject	Mathematics: Statistics			
Code	P03G370V01301			
Study programme	(*)Grao en Enxeñaría Forestal			
Descriptors	ECTS Credits	Type	Year	Quadmester
	6	Basic education	2nd	1st
Teaching language	Spanish			
Department				
Coordinator	Iglesias Pérez, María Carmen			
Lecturers	Iglesias Pérez, María Carmen			
E-mail	mcigles@uvigo.es			
Web	http://webs.uvigo.es/mcigles/			
General description	(*)Esta materia ten como obxectivo proporcionar unha formación estatística básica en descrición de datos, cálculo de probabilidades e inferencia estatística, poñendo o acento nos aspectos aplicados á enxeñaría forestal.			

Competencies

Code		Typology
CG4	CG-04: Capacidade para comprender os seguintes fundamentos necesarios para o desenvolvemento da actividade profesional: Matemáticos.	• know • Know How
CE11	(*)CE-11: Aptitude para aplicar os coñecementos sobre estatística e optimización. Programas informáticos estadísticos de interese en enxeñaría.	• know • Know How
CT1	(*)CBI 1: Capacidade de análise e síntese.	• know • Know How
CT6	(*)CBI 6: Adquirir capacidade de resolución de problemas.	• Know How
CT11	(*)CBP 4: Habilidades de razoamento crítico.	• Know How
CT12	(*)CBP 5: Desenvolver un compromiso ético, que implique o respecto dos dereitos fundamentais e de igualdade entre homes e mulleres, e dos principios de igualdade de oportunidades, accesibilidade universal a persoas con discapacidade e educación para a paz.	• Know be
CT13	(*)CBS 1: Aprendizaxe autónoma.	• Know How
CT19	(*)CBS 7: Motivación pola calidade.	• Know be

Learning outcomes

Learning outcomes	Competences
(*)Purchase the basic statistical training in description of data, calculation of probabilities, statistical inference and optimisation in regression applied to the Forest Engineering.	CG4 CE11 CT1 CT6 CT11 CT12 CT13 CT19

New

Contents

Topic	
1. Sampling and descriptive statistics	1.1 Definition and field of application of the Statistics. 1.2 basic Concepts of sampling. Methods of random sampling. 1.3 descriptive Statistics: Measures of position, dispersion and form. 1.4 descriptive Statistics: Tables and graphic representations.
2. Probability	2.1 random Experiment. Sample space. Events. 2.2 Probability: concept, properties and methods of determination. 2.3 Probability conditioned. Independence of events. 2.4 fundamental Theorems: of the product, total probabilities and Bayes.
3. Random variables and remarkable distributions	3.1 Concept of random variable (v.To.) 3.2 random Variables discreet and continuous. 3.3 Characteristics of a v.To. 3.4 Models associated to a Process of Bernouilli. 3.5 Models associated to a Process of Poisson. 3.6 The Normal distribution. 3.7 Other remarkable models.

4. Intervals of confidence	4.1 Estimator: concept and properties. 4.2 The average, variance and proportion samples. 4.3 Intervals of confidence for the average, variance and proportion. 4.4 Calculation of the size of the sample. 4.5 Intervals of confidence for the difference of averages and proportions.
5. Contrasts of hypothesis	5.1 Definition and classical methodology of a contrast: types of hypothesis, errors associated to the contrast, level of significance, region of rejection. Power. 5.2 Critical Level or p-value. 5.3 Contrasts for the comparison of averages and variances of dosdistribuciones normal. 5.4 Contrast chi-square of independence. 5.5 Contrasts of normality.
6. Introduction to the models of regression	6.1 Measurement of the linear association: covariance and coefficient of linear correlation. 6.2 Formulation of the model of simple linear regression. 6.3 Estimate of the parameters. 6.4 Intervals of confidence and contrasts of hypothesis. 6.5 Analyses of the variance and coefficient of determination. Goodness of adjust. 6.6 Validation of the structural hypotheses. 6.7 Prediction. 6.8 linear Model general. 6.9 Strategies of regression and comparison of models. Selection of optimum models.

Planning

	Class hours	Hours outside the classroom	Total hours
Master Session	15	15	30
Troubleshooting and / or exercises	15	15	30
Autonomous troubleshooting and / or exercises	0	24	24
Practice in computer rooms	14	14	28
Tutored works	1.5	10	11.5
Long answer tests and development	2	12	14
Practical tests, real task execution and / or simulated.	1	7	8
Jobs and projects	2	2.5	4.5

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

	Description
Master Session	(*) Exposición por parte do profesor dos fundamentos teóricos, que deberán estudarse fóra de clase. Ao principio de cada tema proporcionarase aos alumnos apuntes e/ou material para un mellor seguimento da clase. Trabállanse as competencias CG4 e CE11.
Troubleshooting and / or exercises	(*) Clases na aula dedicadas a resolver exercicios, e a expor, resolver ou analizar e interpretar problemas. Trabállanse as competencias CG4, CE11, CT1, CT6, CT11 e CT19.
Autonomous troubleshooting and / or exercises	(*) En cada tema os alumnos deberán traballar sobre un boletín para saber resolver problemas e exercicios similares aos de clase. Tamén se proporá indagar sobre cuestións de interese. Así mesmo, os alumnos realizarán cuestionarios de autoevaluación ao final dos temas ou bloques da materia. Trabállanse todas as competencias da materia.
Practice in computer rooms	(*) Manexo de software estatístico por parte de cada alumno. Fundamentalmente usase EXCEL ou CALC, e algo de R Commander. En cada tema, traballarase no computador seguindo un guión para aprender a aplicación, cálculo e interpretación dos conceptos e técnicas básicas de estatística sobre arquivos de datos relacionados co ámbito da Enxeñaría Forestal. Trabállanse as competencias CG4, CE11, CT1, CT6, CT11, CT12 e CT19.

Tutored works	<p>(*) Os alumnos organizaranse en grupos de traballo para o estudo dun caso de datos reais ou dunha simulación.</p> <p>Cada grupo deberá elixir un problema relacionado co ámbito da Enxeñaría Forestal, obter ou simular datos relativos ao mesmo, describilos e analízalos estatisticamente e extraer algunhas conclusións relevantes.</p> <p>O traballo realizarase maioritariamente fora da aula, aínda que haberá unha parte de elaboración e supervisión presencial.</p> <p>Así mesmo a presentación do traballo será presencial.</p> <p>Trabállanse todas as competencias da materia.</p>
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Personalized attention

Methodologies	Description
Tutored works	

Assessment

	Description	Qualification	Evaluated	Competences
Autonomous troubleshooting and / or exercises	(*)Avaliaranse as actividades (problemas, cuestións, exercicios de computador) entregadas durante o curso e os cuestionarios de autoevaluación.	20		CG4 CE11 CT1 CT6 CT11 CT12 CT13 CT19
Long answer tests and development	(*)Exame escrito de problemas e pequenas cuestións de teoría. Hai que sacar un mínimo para compensar (4 sobre 10).	50		CG4 CE11 CT1 CT6 CT11 CT12 CT19
Practical tests, real task execution and / or simulated.	(*)Exame do software estatístico na aula de informática. Hai que sacar un mínimo para compensar (4 sobre 10).	20		CG4 CE11 CT1 CT6 CT11 CT12 CT19
Jobs and projects	(*)Cualificación do contido e presentación do traballo de grupo.	10		CG4 CE11 CT1 CT6 CT11 CT12 CT13 CT19

Other comments on the Evaluation

Sources of information

Basic Bibliography

Navidi, W., Estadística para Ingenieros y Científicos, Mc. Graw Hill, 2006
Cao Abad, R. y otros, Introducción a la Estadística y sus aplicaciones, Pirámide, 2001
Peña, D., Estadística. Modelos y Métodos. Fundamentos, Alianza Universidad, 1994

Complementary Bibliography

Alea Riera, V. y otros., Guía para el análisis estadístico con R Commander, Barcelona: Universidad de Barcelona, 2014

Pérez López, C., Estadística aplicada : conceptos y ejercicios a través de Excel, Madrid : Ibergarceta Publicaciones, 2012

Devore, J., Probabilidad y estadística para ingeniería y ciencias, Thomson, 2008

Walpole, R. E. et al., Probabilidad y estadística para ingeniería y ciencias, Pearson Educación, 2007

Rodríguez Muñoz, L.J. y otros, Métodos estadísticos para ingeniería, Madrid : Garceta, 2011

Framiñán Torres, J.M. y otros, Problemas resueltos de probabilidad y estadística en la ingeniería, Universidad de Sevilla, 2014

Susan Milton, J., Estadística para Biología y Ciencias de la Salud, McGraw Hill Interamericana, 2007

Ríos, F., Barón, F.J., Sánchez, E. y Parras, L., Bioestadística: métodos y aplicaciones, SPICUM (U. Málaga), 1995

<http://www.aulafacil.com/Excel/temario.htm>,

<http://knuth.uca.es/moodle/mod/resource/view.php?id=1126>,

<https://estadisticaorquestainstrumento.wordpress.com/>,

Recommendations

Subjects that it is recommended to have taken before

Mathematics: Overview of mathematics/P03G370V01203

Mathematics: Mathematics and IT/P03G370V01103

IDENTIFYING DATA				
Edaphology				
Subject	Edaphology			
Code	P03G370V01302			
Study programme	(*)Grao en Enxeñaría Forestal			
Descriptors	ECTS Credits	Type	Year	Quadmester
	6	Mandatory	2nd	1st
Teaching language				
Department				
Coordinator	Marcet Miramontes, Purificación			
Lecturers	Marcet Miramontes, Purificación			
E-mail	marcet@uvigo.es			
Web				
General description				

Competencies		
Code		Typology
CG6	CG-06: Capacidade para identificar os diferentes elementos: elementos bióticos.	• know • Know How
CG7	CG-07: Capacidade para identificar os diferentes elementos: elementos físicos.	• know • Know How
CE10 (*)	CE-10: Coñecementos básicos de xeoloxía e morfoloxía do terreo e a súa aplicación en problemas relacionados coa enxeñaría. Climatoloxía. Capacidade para coñecer, comprender e utilizar os principios de: ciencias do medio físico: xeoloxía, edafoloxía e climatoloxía.	• know
CT1 (*)	CBI 1: Capacidade de análise e síntese.	• know • Know How
CT2 (*)	CBI 2: Capacidade de organización e planificación.	• know • Know How
CT3 (*)	CBI 3: Capacidade de comunicación oral e escrita tanto na lingua vernácula como en linguas estranxeiras.	• know • Know How
CT6 (*)	CBI 6: Adquirir capacidade de resolución de problemas.	• Know How
CT7 (*)	CBI 7: Adquirir capacidade na toma de decisións.	• Know How
CT8 (*)	CBP 1: Capacidades de traballo en equipo, con carácter multidisciplinar e en contextos tanto nacionais como internacionais.	• Know be
CT20 (*)	CBS 8: Sensibilidade cara a temas ambientais.	• Know be

Learning outcomes	
Learning outcomes	Competences
(*)	CG6 CG7 CE10 CT1 CT2 CT3 CT6 CT7 CT8 CT20

(*)Coñecer os elementos básicos da dirección de equipos de proxectos en *AAPP e Sector non Lucrativo

Contents	
Topic	
1. Introducción The wool environmental geology	Minerales, cristales and rocks. Geodynamic Internal. Geodynamic External. Geology of Galicia. Geological resources.
2. The soil: Approaches, work and study.	The soil: conceptual approaches. Edafic organizations. Edafology. The Science of the soil.
3. Ecological factors of training	Genesis of soils: factors and processes. Spatial variability of the soil. Horizonation. Ecological factors of training of soil.

4. Meteorization of rocks and minerals and edaphogenesis.	Weathering. Type and processes of weathering. Approach general of wool edaphogenesis. Conceptual model: basic processes in the development of the soil. Basic processes and resultant horizons. Weatherization and Deep geochemical
5. Study of the soils in the field. Morphology and description of the soils.	Place and pedion. Wool calcata. Morphology of the soil. Study of wool internal organization of a soil. Interpretation of a profile of a soil. Properties and characteristics of a soil. Your work of transferring. Description of floors. Horizons of the soil: Horizons genetic and horizons of diagnosis
6. Physical properties and behavior of the soil.	The soil as a system of three phases. Physical properties of the soil. Composition granulometric. Texture. Color. Structure of the soil: description of wool organization of wool individual particles. Density and porosity
7. Inorganic components of the soil	Origin of minerals of soil. The minerals of wool particles of soil. Minerals of wool fraction, sand and limo. Minerals of wool fraction clay
8. Organic components of the soil.	Contributions of organic subject. Organic subject of the soil and humus. Your work of wool organic subject of the soil. Factors that influence in the content, class and evolution of wool organic subject of the soil. Relation C / N. Evolution of wool organic subject of the soil. Importance environmental of wool organic subject of the soil
9. Chemical properties, physical-chemical and behavior of the soil	Chemical of the soils. Forms in that find the chemical elements in the soils: bioavailability. Colloidal properties of the soil and react of surface. Capacity of exchange Cationic. Reaction of soil. Salinity, Sodcity and Alkalinity of soil. Potential of Oxidation-Reduction. Pollution of soils.
10. Ecology of the soil and cycle of the element	Soil and biodiversity: flows of nutrient and energy. Rhizosphere. Your work of the organisms in the soil. Cycles biogeochemicals.
11. Water of soil: content, potentials and movement.	Content of water in the soil. Measure of the content of water in the soil. Energy of water in soil: potential water and its components. Hydraulic conductivity. Infiltration. Classes of drainage
12. Introduction The wool classification of the soils.	Wool classification of soils. Soil Taxonomy. World Reference Base was Soil Resources.
13. Quality and sustainability: Forests and quality of the ecosystem	I have ecosystem forest and I soil. Management or forest management sustainable. Quality of the soil. Indicators of quality. Evaluation of wool quality of forest soils
14. Climatology	Factors that condition wool expression of a climate. Elements of the climate. Atmospheric circulation. Analysis and prediction of the time. Wools climatic classifications.

Planning

	Class hours	Hours outside the classroom	Total hours
Laboratory practises	16	14	30
Outdoor study / field practises	5	2	7
Presentations / exhibitions	3	20	23
Master Session	30	60	90

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

	Description
Laboratory practises	Activities of application of the knowledge to concrete situations and of acquisition of basic and procedural skills related to the subject matter of study. They are developed in special spaces with specialized equipment (scientific-technical laboratories, languages, etc.).
Outdoor study / field practises	Activities of application of the knowledge to concrete situations and of acquisition of basic and procedural skills related to the subject matter of study. They are developed in non-academic outer spaces. Among them we can mention field practices, visits to events, research centers, companies, institutions ... of academic-professional interest for the student
Presentations / exhibitions	Exposition by the student to the teacher and / or a group of students of a topic about contents of the subject or the results of a work, exercise, project ... It can be carried out individually or in a group.
Master Session	Teacher presentation of contents on the subject matter of study, theoretical bases and / or guidelines of a work, exercise or project to be developed by the student

Personalized attention

Methodologies	Description
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Laboratory practises

Outdoor study / field practices

Presentations / exhibitions

Assessment			
	Description	Qualification	Evaluated Competences
Master Session		60	CE10 CT1 CT6
Laboratory practises		20	CT1 CT2 CT6 CT7 CT8 CT20
Presentations / exhibitions		20	CT2 CT3 CT20

Other comments on the Evaluation

Sources of information

Basic Bibliography

Complementary Bibliography

PORTA, J., LÓPEZ-ACEVEDO, M. , ROQUERO DE LABURU, C., Edafología para la agricultura y el medio ambiente, 2003, Mundi Prensa

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PORTA, J. ,LÓPEZ-ACEVEDO M., Agenda de campo de suelos. Información de suelos para la agricultura y el medio ambiente. del suelo., 2005, Mundi-Prensa

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WHITE R., Principles and practice of soil science, 2007, Blackwell

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BLANCO H., LAL R., Principles of soil conservation and management, 2008, Springer

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Ledesma, Manuel, , "Climatología y meteorología agrícola", 2000, Paraninfo

Elías Castillo, Francisco / Castellví Sentís, Francesc., "Agrometeorología", 2001, Mundi-Prensa

Recommendations

IDENTIFYING DATA				
Botany				
Subject	Botany			
Code	P03G370V01303			
Study programme	(*)Grao en Enxeñaría Forestal			
Descriptors	ECTS Credits	Type	Year	Quadmester
	6	Mandatory	2nd	1st
Teaching language				
Department				
Coordinator	Paz Bermudez, Maria Graciela			
Lecturers	Paz Bermudez, Maria Graciela			
E-mail	graciela@uvigo.es			
Web	http://http://faitic.uvigo.es/index.php/es/			
General description	(*)Coñece-los conceptos básicos e a terminoloxía específica para aprender a diferenza-los grandes grupos de organismos que estuda a Botánica, incidindo nos grupos con maior presenza no ámbito forestal galego.			

Competencies		
Code		Typology
CG1	CG-01: Capacidade para comprender os seguintes fundamentos necesarios para o desenvolvemento da actividade profesional: Biolóxicos.	• know • Know How
CG6	CG-06: Capacidade para identificar os diferentes elementos: elementos bióticos.	• know • Know How
CG8	CG-08: Capacidade para identificar os diferentes elementos: recursos naturais renovables susceptibles de protección, conservación e aproveitamento.	• know • Know How
CG14	CG-14: Capacidade para o uso das técnicas de protección do medio forestal.	• Know How
CG16	CG-16: Capacidade para o uso das técnicas de conservación da biodiversidade.	• Know How
CE15	(*)CE-15: Capacidade para coñecer, comprender e utilizar os principios de: botánica forestal.	• know • Know How
CT20	(*)CBS 8: Sensibilidade cara a temas ambientais.	• Know be

Learning outcomes	
Learning outcomes	Competences
(*)	CG1 CG6 CG8 CG14 CG16 CE15 CT20

Contents	
Topic	
1. Concept of Botanist.	Categories and taxonomic unities. Botanic nomenclature.
2. Morphological levels of vegetal organization.	Traffic of Therophytes to Cormophytes. Generalities of the vascular plants and its adaptive advantages.
3. The reproduction	Types of reproduction. Biological cycles. Alternation of generations and his importance.
4. The plants with seed (Spermatophytes).	General characters. Root and cut. Main type and modifications. The leaf, special trainings and phylotaxic. Forms of life.
5. The flower.	Concept of flower in gymnosperms and angiosperms. Floral receptacle. Perianth. Androceo. Xineceo. Inflorescences
6. Pollination	Main type and floral syndromes. Evolution of the flower in relation of type of pollination
7. Fertilization	Differences between the fertilization in Gymnosperms and Angiosperms. Training of the seed. Fruits and Infoscences. Dispersion.
8. Gymnosperms	General characters. Reproduction: Vital cycle. Main groups. Division Cycadophyta. Division Ginkgophyta.
9. Division Coniferophyta. General characteristics.	General characteristics. Class Coniferopsida
Class Coniferopsida	
10. Order Coniferales, Family Pinaceae.	General characteristics. Ecological importance, forestal and economic. Genders more representative.
11. Family Cupressaceae.	General characteristics. Genders more representative.

12. Family Taxodiaceae.	General characters. Genders more relevant. Forestal importance and examples. Family Araucariaceae, species more relevant.
13. Quotation of the families Podocarpaceae and Cephalotaxaceae. Order Taxales, Family Taxaceae, species more relevant and forestal importes.	(*)
14. Anxiospermas. Div. Magnoliophyta General characters.	Reproduction: Vital cycle. Differential characters go in the classes Magnoliopsida (Dicotyledonous) and Liliopsida (monocotiledóneas).
15. Magnoliopsida Class (dicotyledonous). Subclass 1: Magnoliidae. General characters.	Families: Magnoliaceae, Lauraceae, Ranunculaceae, Berberidaceae. Genders and species more important and examples.
16. Subclass 2: Hamamelididae.	General characters of the families Hamamelidaceae and Platanaceae. Species of forestal and ornamental interest.
17. Special quotation of the families Fagaceae and Betulaceae.	Genders and species more relevant. Ecological and economic interest.
18. Family Juglandaceae. General characters of the families Ulmaceae and Moraceae.	(*)
19. Subclass 3: Caryophyllidae.	General characters. Quotation of the most important orders. Examples.
20. Subclass 4: Dilleniidae.	General characters of the families of main economic and forestal: Theaceae, Tiliaceae, Cistaceae, Salicaceae, Brassicaceae, Ericaceae.
21. Subclass 5: Rosidae.	Families of main forestal interest: Rosaceae, Leguminosaceae, Myrtaceae, Aquifoliaceae, Rutaceae, Anacardiaceae, Hippocastanaceae, Aceraceae, Rhamnaceae, Buxaceae.
22. Subclass 6: Asteridae.	Quotation of the most representative families: Solanaceae, Caprifoliaceae, Lamiaceae, Oleaceae and Asteraceae
23. Class Liliopsida (monocotiledoneas).	Differential characters and families more significant.
24. Concept of Geobotanic	Distribution of the plants and floristic territories. Biogeographic kingdoms.

Planning

	Class hours	Hours outside the classroom	Total hours
Outdoor study / field practices	2	0	2
Laboratory practises	16	10	26
Autonomous troubleshooting and / or exercises	4	28	32
Master Session	30	60	90

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

	Description
Outdoor study / field practices	Activities application of knowledge to specific situations and basic skills acquisition and related procedural matter under study. They thrive in nonacademic outdoor spaces. Among them we can cite practical field visits to events, research centers, companies, institutions ... academic-professional interest to the student.
Laboratory practises	Activities application of knowledge to specific situations and basic skills acquisition and related procedural matter under study. Special spaces are developed with specialized equipment (scientific and technical laboratories, languages, etc.).
Autonomous troubleshooting and / or exercises	Actividade in which problems are formulated and / or exercises related to the course. The student must develop the analysis and resolution of problems and / or exercises independently.
Master Session	Presentation by the teacher of the contents on the subject under study, theoretical and / or guidelines for a job, exercise or project to be developed by the student.

Personalized attention

Methodologies	Description
Laboratory practises	
Autonomous troubleshooting and / or exercises	

Assessment

	Description	Qualification	Evaluated Competences
Master Session	(*)Proba con preguntas tipo test, de resposta curta e de resposta longa; o alumnado deberá demostrar os coñecementos adquiridos. Avalían-se as competencias A2,A8,A68	70	CG1 CG6 CE15

Laboratory practises	(*)Farase unha avaliación continua ó alumnado das actividades plantexadas nas clases prácticas. Ó final do curso o alumnado deberá entregar unha memoria final e/ou realizar unha proba sobre identificación de distintos pliegos de especies forestais. Avaliáanse as competencias A10,A18,A20	20	CG8 CG14 CG16
Outdoor study / field practices	(*)No exame de laboratorio integraranse os coñecementos adquiridos nas saídas de campo. Avaliase a competencia B20	5	CT20
Autonomous troubleshooting and / or exercises	(*)No exame da sesión magistral integraranse os coñecementos adquiridos coa resolución de problemas dun xeito autónomo. Ó final do curso o alumnado deberá entregar un herbario formado, principalmente, polas especies forestais tratadas na parte teórica e/ou un traballo bibliográfico ou de investigación. Estes coñecementos poderán integrarse no exame de laboratorio ou valorarse dun xeito independente Avaliáanse as competencias A68,B20	5	CE15 CT20

Other comments on the Evaluation

Sources of information

Basic Bibliography

Complementary Bibliography

- Díaz González T. E., Fernández-Carvajal M. C., Fernández Prieto J. A., Curso de Botánica, Ed. Trea, Oviedo, 2004
- Izco J. (coord.), Botánica, Ed. McGraw- Hill. Interamericana, Madrid., 2004
- Nabors M.W., Introducción a la Botánica, Ed. Pearson, Madrid., 2006
- Strasburger, E., Tratado de Botánica, Ed. Omega, Barcelona, 2004
- Blanco Castro, E. et al., Los Bosques Ibéricos. Una interpretación Geobotánica., Ed. Planeta, Barcelona, 2005
- Castro, M.; Prunell, A. & Blanco-Dios, J., Guía das árbores autóctonas e ornamentais de Galicia., Ed. Xerais, Vigo, 2007
- Castroviejo, S. (coord.), Flora iberica: Plantas vasculares de la Península Ibérica e Islas Baleares., Real Jardín Botánico, C.S.I.C. Madrid, 1986-2010
- García, X.R., Guía das plantas de Galicia, Ed. Xerais, Vigo, 2008
- López González, G., Guía de los árboles y arbustos de la península Ibérica y Baleares, Mundi-Prensa Libros, 2007
- Carrión, J.S., Evolución vegetal, DM, 2003
- Niño Ricoi, H., Guía das árbores de Galicia, Bahía, 1997
- Polunin, O. & Smythies, B.E., Guía de campo de las flores de España, Portugal y Sudoeste de Francia, Omega, 2004

Recommendations

Subjects that continue the syllabus

- Biology: Plant Biology/P03G370V01201
- Forestry Ecology/P03G370V01402

IDENTIFYING DATA**Electrotechnology and rural electrification**

Subject	Electrotechnology and rural electrification			
Code	P03G370V01304			
Study programme	(*)Grao en Enxeñaría Forestal			
Descriptors	ECTS Credits	Type	Year	Quadmester
	6	Mandatory	2nd	1st
Teaching language	Spanish Galician			
Department				
Coordinator	Moldes Eiroa, Ángel			
Lecturers	Moldes Eiroa, Ángel			
E-mail	angelmoldes@uvigo.es			
Web				
General description	(*)Se estudiarán los principios de funcionamiento de la electricidad y los circuitos eléctricos, así como los componentes, el diseño y el cálculo de una instalación eléctrica.			

Competencies

Code	Typology
CG28 CG-28: Coñecementos das seguintes materias necesarios tanto para a xestión dos sistemas forestais como para a súa conservación: electrificación.	• know
CE14 (*)CE-14: Capacidade para coñecer, comprender e utilizar os principios de: electrotecnia e electrificación forestais.	• know • Know How

Learning outcomes

Learning outcomes	Competences
(*)	CG28 CE14
(*) Coñecer o réxime de impugnación das actuacións administrativas	

Contents

Topic
INTRODUCTION AND AXIOMS
CIRCUITS OF CONTINUOUS CURRENT
CIRCUITS OF ALTERNATES CURRENT
TRIFÁSIC SYSTEMS BALANCED
OPERATION OF THE NATIONAL ELECTRICAL SYSTEM
ELEMENTS OF AN ELECTRICAL SYSTEM
CALCULATION OF ELECTRICAL INSTALLATIONS
ELECTRONIC REGULATION FOR LOW TENSION

Planning

	Class hours	Hours outside the classroom	Total hours
Master Session	16	16	32
Troubleshooting and / or exercises	16	48	64
Laboratory practises	16	0	16
Practice in computer rooms	12	18	30
Troubleshooting and / or exercises	3	0	3
Short answer tests	1	0	1
Jobs and projects	4	0	4

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

	Description
Master Session	EXHIBITION BY PART OF The PROFESSOR OF The THEORETICAL BASES OF The ASIGN#PUT
Troubleshooting and / or exercises	FORMULATION And RESOLUTION OF PROBLEMS RELACIONED WITH The ASIGN#PUT
Laboratory practises	ACTIVITIES OF APPLICATION OF KNOWLEDGES IN SPACES WITH SPECIALIZED EQUIPMENT

Personalized attention	
Methodologies	Description
Master Session	
Troubleshooting and / or exercises	
Practice in computer rooms	
Laboratory practises	

Assessment			
	Description	Qualification	Evaluated Competences
Laboratory practises	EVALUATED BY MEANS OF IT DELIVERS OF A MEMORY WITH THE RESULTED NUMERICAL OBTAINED IN THE PRACTICAL	10	CG28 CE14
Short answer tests	EVALUATED BY MEANS OF THE FORMULATION OF QUESTIONS THAT THE STUDENT WILL OWE TO ANSWER OF FORM WRITTEN	20	CG28 CE14
Troubleshooting and / or exercises	EVALUATED BY MEANS OF THE FORMULATION OF PROBLEMS THAT THE STUDENT WILL OWE TO ANSWER OF FORM WRITTEN	40	CG28 CE14
Jobs and projects	EVALUATED THE QUALITY OF ONE PROJECT OF ELECTRIC INSTALLATION CALCULATED BY THE STUDENT	30	CG28 CE14

Other comments on the Evaluation

Sources of information

Basic Bibliography

Complementary Bibliography

PARRA, PEREZ, PASTOR, ORTEGA, TEORÍA DE CIRCUITOS, 2003, UNED
 GONZÁLEZ, GARRIDO, CIDRÁS, EJERCICIOS RESUELTOS DE CIRCUITOS ELÉCTRICOS, 1999, ANDAVIRA EDITORA
 SPITTA, INSTALACIONES ELÉCTRICAS, 1980, DOSSAT
 MINISTERIO CIENCIA Y TECNOLOGÍA, R.D. 842/2002 REGLAMENTO ELECTROTÉCNICO PARA BAJA TENSIÓN, 2002, BOE
 MINISTERIO CIENCIA Y TECNOLOGÍA, R.D.223/2008 REGLAMENTO DE LÍNEAS ELÉCTRICAS DE ALTA TENSIÓN, 2008, BOE
 MINISTERIO CIENCIA Y TECNOLOGÍA, R.D.337/2014 REGLAMENTO SOBRE CONDICIONES TÉCNICAS Y GARANTÍAS DE SEGURIDAD EN INSTALACIONES ELÉCTRICAS DE ALTA TENSIÓN, 2014, BOE

Recommendations

Subjects that it is recommended to have taken before

Physics: Physics I/P03G370V01102
 Physics: Physics II/P03G370V01202
 Mathematics: Overview of mathematics/P03G370V01203
 Mathematics: Mathematics and IT/P03G370V01103

IDENTIFYING DATA**Forest entomology and Zoology**

Subject	Forest entomology and Zoology		
Code	P03G370V01305		
Study programme	(*)Grao en Enxeñaría Forestal		
Descriptors	ECTS Credits	Type	Year
	6	Mandatory	2nd
Teaching language	1st		
Department			
Coordinator	Paz Bermudez, Maria Graciela		
Lecturers	López de Silanes Vázquez, María Eugenia Paz Bermudez, Maria Graciela Souto Otero, José Carlos		
E-mail	graciela@uvigo.es		
Web	http://http://faitic.uvigo.es/index.php/es/		
General description	(*)Esta materia ensina ó alumnado os fundamentos de zooloxía, con énfase nas especies máis comúns nos nosos bosques. Dada a gran importancia da entomoloxía no medio forestal, unha parte importante da materia adicárase a esta disciplina. Finalmente, outro bloque de temas centrarase en xenética, especialmente na de poboacións, co fin de que o alumno poida adquirir uns coñecementos fundamentais para comprende-la dinámica e a evolución das poboacións animais.		

Competencies

Code		Typology
CG1	CG-01: Capacidade para comprender os seguintes fundamentos necesarios para o desenvolvemento da actividade profesional: Biolóxicos.	• know • Know How
CG6	CG-06: Capacidade para identificar os diferentes elementos: elementos bióticos.	• know • Know How
CG8	CG-08: Capacidade para identificar os diferentes elementos: recursos naturais renovables susceptibles de protección, conservación e aproveitamento.	• know • Know How
CG16	CG-16: Capacidade para o uso das técnicas de conservación da biodiversidade.	• Know How
CE13	(*)CE-13: Capacidade para coñecer, comprender e utilizar os principios de: zooloxía e entomoloxía forestais; fundamentos biolóxicos do ámbito animal na enxeñaría.	• know • Know How
CT20	(*)CBS 8: Sensibilidade cara a temas ambientais.	• Know be

Learning outcomes

Learning outcomes	Competences
(*)	CG1 CG6 CG8 CG16 CE13 CT20

Contents

Topic	
I. General zoology	1. Introduction to the zoology 2. Structure of the animal cells 3. The cellular division 4. The fabrics
II. Genetic	1. Introduction to the mendelism 2. Nature of the hereditary material 3. Genetic structure of the populations 4. Changes of the genic frequencies 5. The continuous variation
III. Descriptive zoology	1. General characters of the invertebrates 2. Entomology. Characteristic and importance of the insects 3. Cordados. Introduction to fishes, amphibious and reptilian 4. Birds and mammalian

Planning

	Class hours	Hours outside the classroom	Total hours

Master Session	32	48	80
Laboratory practises	16	26	42
Troubleshooting and / or exercises	4	24	28

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

	Description
Master Session	Presentation by the teacher of the contents on the subject under study, theoretical and / or guidelines for a job, exercise or project to be developed by the student.
Laboratory practises	Activities application of knowledge to specific situations and basic skills acquisition and related procedural matter under study. Special spaces are developed with specialized equipment (scientific and technical laboratories, languages, etc.).
Troubleshooting and / or exercises	Activity which formulated problem and / or exercises related to the course. The student should develop appropriate solutions or right through the exercise routines, application of formulas or algorithms, application processing procedures available information and interpretation of the results. It is often used to complement the lecture.

Personalized attention

Methodologies	Description
Master Session	
Laboratory practises	

Assessment

	Description	Qualification	Evaluated Competences
Master Session	(*)1.-Probas de tipo test 2.-Probas de respuesta corta 3.-Probas de respuesta larga, de desarrollo	75	CG1 CG6 CG8 CG16 CE13 CT20
Troubleshooting and / or exercises (*)		5	CG16
Laboratory practises	(*)Informes/memorias de prácticas e/ou examen práctico	20	CG6 CG8 CG16 CE13 CT20

Other comments on the Evaluation

Sources of information

Basic Bibliography

Complementary Bibliography

Davies RG, Introducción a la entomología, 1989, Mundi-Prensa

Falconer DS, Mackay TFC, Introducción a la genética cuantitativa, 1996, Ed. Acribia

Hickman CP, Roberts LS, Keen S, Larson A, l'Anson H, Eisenhour D, Principios integrales de zoología, 2009, McGraw-Hill Interamericana

Paniagua R (coordinador), Citología e histología vegetal y animal, 2007, Mcgraw-Hill Interamericana

Barrientos JA (ed), Curso práctico de entomología, 2004, : Asociación Española de Entomología ; Alicante :

Carlos de Liñán Vicente (coord), Entomología agroforestal, 1998, Madrid : Ediciones Agrotécnicas, D.L.

Chinery, M., Guía de campo de los insectos de España y de Europa, 2005, Omega

Recommendations

Subjects that are recommended to be taken simultaneously

Forestry Ecology/P03G370V01402

Mathematics: Statistics/P03G370V01301

IDENTIFYING DATA				
Forestry				
Subject	Forestry			
Code	P03G370V01401			
Study programme	(*)Grao en Enxeñaría Forestal			
Descriptors	ECTS Credits	Type	Year	Quadmester
	6	Mandatory	2nd	2nd
Teaching language				
Department				
Coordinator	Picos Martín, Juan			
Lecturers	Picos Martín, Juan			
E-mail	jpicos@uvigo.es			
Web	http://silvicultor.blogspot.com/			
General description	<p>The general aims of the *assignatura are:</p> <p>to) Know the bases, object and foundations of the *Selvicultura</p> <p>*b) Know the foundations of the *Selvicultura Static</p> <p>*c) Know the foundations of the *Selvicultura Dynamic</p> <p>*d) Know the cultural characters of the forest species</p> <p>and) That the professional future was able to analyse and interpret the mountain to be able to propose suitable treatments in each case.</p>			

Competencies		
Code		Typology
CG6	CG-06: Capacidade para identificar os diferentes elementos: elementos bióticos.	• know • Know How
CG7	CG-07: Capacidade para identificar os diferentes elementos: elementos físicos.	• know • Know How
CG8	CG-08: Capacidade para identificar os diferentes elementos: recursos naturais renovables susceptibles de protección, conservación e aproveitamento.	• know • Know How
CG9	CG-09: Capacidade para analizar a estrutura e función ecolóxica dos sistemas e recursos forestais, incluíndo as paisaxes.	• Know How
CG22	CG-22: Capacidade para aplicar e desenvolver as técnicas selvícolas e de manexo de todo tipo de sistemas forestais, parques e áreas recreativas.	• know • Know How
CE17	(*)CE-17: Capacidade para coñecer, comprender e utilizar os principios de: silvicultura.	• know • Know How
CT1	(*)CBI 1: Capacidade de análise e síntese.	• know • Know How
CT5	(*)CBI 5: Capacidade de xestión da información.	• Know How
CT6	(*)CBI 6: Adquirir capacidade de resolución de problemas.	• Know How
CT7	(*)CBI 7: Adquirir capacidade na toma de decisións.	• Know How
CT11	(*)CBP 4: Habilidades de razoamento crítico.	• Know How
CT13	(*)CBS 1: Aprendizaxe autónoma.	• Know How
CT14	(*)CBS 2: Adaptación a novas situacións.	• Know be
CT15	(*)CBS 3: Creatividade.	• Know be

Learning outcomes	
Learning outcomes	Competences
CONSULT TABLE *ASIGNACIO *ÇN RESULTED LEARNING And COMPETITIONS BY MATTER IN http://forestales.uvigo.es/sites/default/files/cv%20*Armesto_0.Pdf#*overlay-*context=is/*content/*profesorado	CG6 CG7 CG8 CG9 CG22 CE17 CT1 CT5 CT6 CT7 CT11 CT13 CT14 CT15

New

Contents

Topic	
Subject I.- Concept and bases of the forestry	1. Concept and classes of forestry 2. Static study of masses
Subject II.- Forestry treatments	3. Dynamic study of the masses. 4. Influence of the ecological factors. 5. Classification of the forestry treatments. 6. Short to fact 7. Short by aclareo successive uniform 8. Short by entresaca 9. Complementary treatments, partial and derivative. 10. Treatments of low mountain and m.Half. 11. Transitory treatments 12. Forestry And defence of the mountain
Subject III.- Main cultural characters Forest species	13. Description of the cultural characters of the main forest species

Planning

	Class hours	Hours outside the classroom	Total hours
Master Session	25.5	47.5	73
Troubleshooting and / or exercises	8	14	22
Outdoor study / field practices	8	8	16
Integrated methodologies	1	11.5	12.5
Case studies / analysis of situations	10.5	14	24.5
Multiple choice tests	0.5	0	0.5
Short answer tests	0.5	0	0.5
Practical tests, real task execution and / or simulated.	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
Master Session	Masterclasses in classroom
Troubleshooting and / or exercises	Resolution of problems and/or exercises in classroom, laboratory or in field.
Outdoor study / field practices	Visit to mountains and forestry works.
Integrated methodologies	- Organization of seminars or specific conferences - Presentations/exhibitions: oral Exhibition by part of the students of a concrete subject or of a work (generally previous presentation written). - Multimedia sessions: Employment of videographic material / on-line on appearances of the subject. - Days of study of appearances previously studied/analysed in the exits of field
Case studies / analysis of situations	- Study of cases/analysis of situations or discussion directed: Formulation, analysis, resolution and debate of a problem or exercise related with the thematic of the subject.

Personalized attention

Methodologies	Description
Case studies / analysis of situations	
Troubleshooting and / or exercises	
Outdoor study / field practices	

Assessment

Description	Qualification	Evaluated Competences

Case studies / analysis of situations	Proof written and/or oral on the similar cases to the resolved in class	20	CG6 CG7 CG8 CG9 CG22 CE17 CT1 CT6 CT11
Integrated methodologies	Proof written and/or *docuemnto memory summary on the activities *desarrolladas	20	CG6 CG7 CG8 CG9 CG22 CE17 CT1 CT5 CT11 CT13 CT15
Master Session	.	0	CG6 CG7 CG8 CG9 CG22 CE17
Multiple choice tests	Proof written on the teaching given in sessions *magistrales	30	CG6 CG7 CG8 CG9 CG22 CE17 CT11 CT13
Short answer tests	Proof written on the teaching given in sessions *magistrales	30	CG6 CG7 CG8 CG9 CG22 CE17 CT11 CT13

Other comments on the Evaluation

To approve the matter have to surpass the common examinations and realise satisfactorily the works that *eventualmente commission . The presence in practise and trips is compulsory. They will not save classifications of the theoretical notes, further of the announcements regulated of the academic year. The proofs of type test in the *convocatorias of examination can have eliminatory character.

Sources of information

Basic Bibliography

Complementary Bibliography

Serrada, R., Montero, G. y Reque, J. Eds, Compendio de *Selvicultura Aplicada en España, Madrid : Instituto Nacional de Investigación y Tecnología Agraria y Alimentaria : Fundación Conde de, 2008

Recommendations

Subjects that continue the syllabus

Forest exploitation/P03G370V01601

Dasometry/P03G370V01602

Forest management/P03G370V01605

Repopulation/P03G370V01603

Forest and pasture management/P03G370V01704

Subjects that are recommended to be taken simultaneously

Botany/P03G370V01303

Forestry Ecology/P03G370V01402

Subjects that it is recommended to have taken before

Biology: Plant Biology/P03G370V01201

IDENTIFYING DATA				
Forestry Ecology				
Subject	Forestry Ecology			
Code	P03G370V01402			
Study programme	(*)Grao en Enxeñaría Forestal			
Descriptors	ECTS Credits	Type	Year	Quadmester
	6	Mandatory	2nd	2nd
Teaching language	Spanish Galician			
Department				
Coordinator	Cordero Rivera, Adolfo			
Lecturers	Cordero Rivera, Adolfo Rivas Torres, Anais Sobrino Garcia, Maria Cristina Villamaña Rodríguez, Marina			
E-mail	adolfo.cordero@uvigo.es			
Web	http://ecoevo.uvigo.es			
General description	(*)A Ecoloxía é a ciencia que estudia a resposta dos organismos ás variacións ambientais, dende o nivel individual ao ecosistema. Esta materia ten como obxectivos proporcionar os coñecementos básicos da Ecoloxía, con especial referencia ao ambiente forestal.			

Competencies		
Code		Typology
CG1	CG-01: Capacidade para comprender os seguintes fundamentos necesarios para o desenvolvemento da actividade profesional: Biolóxicos.	• know • Know How
CG2	CG-02: Capacidade para comprender os seguintes fundamentos necesarios para o desenvolvemento da actividade profesional: Físicos.	
CG3	CG-03: Capacidade para comprender os seguintes fundamentos necesarios para o desenvolvemento da actividade profesional: Químicos.	
CG6	CG-06: Capacidade para identificar os diferentes elementos: elementos bióticos.	• know • Know How
CG7	CG-07: Capacidade para identificar os diferentes elementos: elementos físicos.	
CG8	CG-08: Capacidade para identificar os diferentes elementos: recursos naturais renovables susceptibles de protección, conservación e aproveitamento.	• know • Know How
CG9	CG-09: Capacidade para analizar a estrutura e función ecolóxica dos sistemas e recursos forestais, incluíndo as paisaxes.	• Know How
CG10	CG-10: Coñecemento dos procesos de degradación que afecten aos sistemas e recursos forestais: contaminación.	• know
CG11	CG-11: Coñecemento dos procesos de degradación que afecten aos sistemas e recursos forestais: pragas.	• know
CG13	CG-13: Coñecemento dos procesos de degradación que afecten aos sistemas e recursos forestais en xeral.	• know
CG16	CG-16: Capacidade para o uso das técnicas de conservación da biodiversidade.	• Know How
CG17	CG-17: Capacidade para avaliar e corrixir o impacto ambiental.	
CE12	(*)CE-12: Capacidade para coñecer, comprender e utilizar os principios de: ecoloxía forestal	• know • Know How
CT1	(*)CBI 1: Capacidade de análise e síntese.	• know • Know How
CT6	(*)CBI 6: Adquirir capacidade de resolución de problemas.	• Know How
CT15	(*)CBS 3: Creatividade.	
CT20	(*)CBS 8: Sensibilidade cara a temas ambientais.	• Know be

Learning outcomes	
Learning outcomes	Competences

CE12: Capacity to know, understand and use the principles of Ecology in Forestry. Capacity to know, understand and use the concept of ecosystem. CE03 Ability to understand and apply the evolutionary theory in forest management. CE04 Ability to know and develop demographic analyses in Forestry. CE05 Ability to identify and use ecological interactions in the analysis of forest ecosystems. CE06 Capacity to know, understand and maintain biological diversity in exploited forest ecosystems. CE07 Capacity to develop analyses of energy and matter fluxes in forest ecosystems. CE08 Ability to understand the implications of ecological succession in the management of forest ecosystems. CE09 Ability to know, analyse and control the negative effects of pollution on forest ecosystems. CE10 Ability to know, understand and use ecological principles in the exploitation of populations and control of forest pests. CE11 Capacity to know, understand and use basic principles of conservation biology on the management of forest ecosystems	CG1 CG2 CG3 CG6 CG7 CG8 CG9 CG10 CG11 CG13 CG16 CG17 CE12 CT1 CT6 CT15 CT20
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New

Contents

Topic

0. ORGANIZATION DO COURSE. FORESTS AND FOREST PLANTATIONS.	Development of the subject. Techniques of evaluation of the student: objectives and methods. Forests and plantations: differences and similitudes. The principles of Forest Ecology.
SECTION I. 1. INTRODUCTION TO ECOLOGY.	The concept of sustainability. The demographical problem (implications of human growth population on natural resources). Introduction to Ecology. Levels of biological organization and subdivisions of Ecology. The concept of ecosystem. Forest Ecology and the principle of determinism. The scientific method. Introduction to ecological economics (National accounting and the loss of natural resources. The ecospace and the ecological footprint). Ecology and environmentalism.
SECTION II. THE ENVIRONMENT. 2. THE MATCH BETWEEN ORGANISMS AND THE ENVIRONMENT.	Genotypic and phenotypic variation. Natural selection. Ecotypes. Concept of resource and ecological factor. Ecological effects of solar radiation (Photosynthesis, index of foliar surface, morphology, shadow tolerance, photoperiodism). The temperature and the organisms (Q10, diapause, physiological time, effects on plants, adaptations of plants to unfavourable temperatures). Atmospheric humidity and vegetal adaptations. Effects of the wind on vegetation (dissemination of reproductive propagules, physiological effects, morphological effects). Adaptations to fire.
3. FOREST IMPLICATIONS OF BIOLOGICAL ADAPTATION.	Implications of evolutionary concepts in the exploitation of forests. Importance of the factor light in forestry. Importance of the factor temperature in forestry. Importance of water in forestry. Importance of the wind in forestry.
SECTION III. ECOLOGY OF POPULATIONS. 4. DEMOGRAPHY.	Concept of population. Unitary and modular organisms. Construction and analysis of life tables. Survivorship curves. Age pyramids. Populational growth (geometrical growth, mathematical models, intrinsic rate of growth, innate capacity of increase). Populational growth and intraspecific competition: concept of carrying capacity. Analysis of key factors.
5. INTERACTIONS (I): COMPETITION AND PREDATION.	Theory of niche: concept, multidimensional approach. The relationship between niche and habitat. Type of interactions between organisms. Intraspecific competition (exploitation, interference, densodependency, population regulation, asymmetry). Allelopathy. Interspecific competition (logistical model, model of Tilman). Principle of competitive exclusion. Character displacement. Type of predators. Model of Lotka-Volterra. Examples in the laboratory and the field. Strategies in the search of food. Functional responses. Coevolution prey-predator. Mechanisms of defence of the prey (physical defences, chemical, crypsis, aposematism, mimicry). Interaction herbivores-plants.
6. INTERACTIONS (II): MUTUALISM AND DETRITIVORY.	Concept of mutualism. Types of mutualism (behaviour, care, polinización, intestinal, symbiosis, mycorrhizas). Lichens. Leguminous plants and Rhizobium. Decomposers: Bacteria and fungi. Soil detritivores (earthworms, insects). Aquatic detritivores. Relative role of microflora and detritivores. Interactions detritivore-resource (vegetal detritus, faeces, carrion).
SECTION IV. ESTRUCTURA AND ORGANIZATION OF ECOSYSTEMS. 7. THE BIOLOGICAL COMMUNITY.	Concept. Characteristics of the community. Physical structure (stratification, forms of growth, biomas). Seasonality (Temperate zones, tropical zones). Concept of ecotone (effect of border, ecotones between forests and grasslands). Concept of guild.

8. DIVERSITY IN FOREST ECOSYSTEMS.	Concept and type of diversity. Why preserve biodiversity? The measure of the biodiversity (index of Shannon, rank-abundance plots). Latitudinal gradient of biodiversity. Main forest activities and their effect on biodiversity. Techniques for maintaining biodiversity in forest plantations. Principles of eco-forestry.
9. PRIMARY PRODUCTIVITY.	Production and respiration (biomass, net and gross production). Type of photosynthesis (plants C3, C4 and CAM). Methods to measure primary productivity. Quimiosynthesis. Limiting factors of primary productivity (terrestrial and aquatic communities). Relation Productivity:Biomass in natural ecosystems. The productivity of forest ecosystems (factors that affect forest NPP; NPP of forests and monocultures).
10. FLOW OF ENERGY.	Thermodynamics. Trophic levels. Trophic chains and nets. Ecological pyramids. Diagramas of flow of energy. Storage and dynamic of the energy in ecosystems. Effects of the exploitation of forests in the flow of energy.
11. CYCLES DE MATHER.	Circulation of the mather. Biogeochemical cycles (P, N, S, C, the greenhouse effect). Cycles of elements in forest ecosystems (effect of the age of the trees, of the type of ecosystem, of the type of tree, effects over production, additions and losses of nutrients, effects of the extraction of wood on long-term productivity).
12. THE ECOLOGICAL SUCESSION.	The sucession (primary/secondary, alogenic/autogenic/biogenic, degradative). Hypothesis on sucession and the concept of climax. Mechanisms behind sucession (colonization, alteration of the environment, species displacement). Sucessional models (Horn, Tilman). Changes in the functioning of the ecosystems during the sucession. Examples of sucessions (abandoned fields, cyclic sucession). Importance of the sucession in the exploitation of the forests.
SECTION V. APPLIED ECOLOGY.	
13. POLLUTION.	Definition. Types of pollutants. The acid rain (effects of the sulphur compounds on plants and animals: the decline of forest ecosystems). The hole in the layer of ozone. Noise. Watter pollution. Bioindicators of water quality. Eutrophication (Causes, recovery of eutrophic lakes).
14. EXPLOITATION AND CONTROL OF POPULATIONS.	Concept of maximum sustainable yield. Models of exploitation (fixed quota). Principles about the exploitation of populations (regulation of the effort of exploitation, instability, exploitation of a percentage, dynamic models). The exploitation of the forests. Techniques of pest control (aims, chemical control, biological control, genetic control, integrated control).
15. BASIC PRINCIPLES OF CONSERVATION BIOLOGY.	The number of species that inhabit the planet. The value of the species and ecosystems (intrinsic, instrumental, peculiarity). Processes and causes of extinction (historic extinctions, antropic effects). Management of ecosystems. Social, economic and political factors.
16. INTRODUCCIÓN TO THE ENVIRONMENTAL IMPACT ASESMENT (EIA).	Fundamentals, terminology and definitions. Objectives of the EIA. Phases of the EIA. Methods and models to define the relation cause-effect.
Practicals in the classroom.	Methods and devices of sampling (devices for air, plants, soil, and water sampling). Methods of mark-recapture (index of Lincoln, method of Jolly). Relative estimates (selective predation, progressive predation, captures by unity of effort).
1. METHODS IN FIELD ECOLOGY: mobile populations.	
Practicals in the classroom.	Quadrats. Transects. Linear interception. Punctual interception. Method of the quadrats centered in a point. Spatial distribution (patterns of distribution). Experiment: sampling of a simulated community of plants.
2. METHODS DE WORK EN ECOLOGY DE FIELD: sessile populations.	
Practicals in the computer room.	Variability of body size in different types of organisms. Concept of allometry. Types of allometry. Examples. Study of problems to determine of the existence of allometry.
3. ECOLOGICAL IMPORTANCE OF BODY SIZE: ALLOMETRY.	
Practicals in the laboratory.	Methods of determination of the age in different type of organisms.
4. METHODS DE DETERMINATION OF AGE.	Growth of the organisms. Experiment: studio of the growth in different tree species.
(*)Práctica de laboratorio.	(*)Utilización do método Winkler para a determinación da actividade fotosintética e respiratoria
5. METABOLISMO MICROBIANO	
Field practicals. 1. Forest pests.	Density of Gonipterus scutellatus on Eucalyptus, and biological control by means of its parasitoid Anaphes nitens.
Field practices. 2. Estimation of water quality in the river Alfofrei by means of biological methods.	The use of bioindicators to study river water quality.

Planning

	Class hours	Hours outside the classroom	Total hours
Master Session	30	45	75

Outdoor study / field practices	9.8	14.7	24.5
Laboratory practises	9	13.5	22.5
Classroom work	7	10.5	17.5
Practice in computer rooms	3	4.5	7.5
Short answer tests	2	0	2
Troubleshooting and / or exercises	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
Master Session	Class room lectures.
Outdoor study / field practices	Field work in forest ecosystems
Laboratory practises	Laboratory practical lectures
Classroom work	Class room work
Practice in computer rooms	Simulations of ecological systems in the computer room

Personalized attention

Methodologies	Description
Master Session	

Assessment

	Description	Qualification	Evaluated Competences
Master Session	A final written examination will be used to evaluate the work done over the course.	70	CG1 CG6 CG8 CG9 CG10 CG11 CG13 CG16 CE12 CT1 CT6 CT20
Classroom work	(*)Avaliarase no exame escrito da materia	10	CG1 CG6 CG8 CG9 CG10 CG11 CG13 CG16 CE12 CT6

Outdoor study / field practices	(*)Avaliarase no exame escrito da materia	8	CG1 CG6 CG8 CG9 CG10 CG11 CG13 CG16 CE12 CT20
Laboratory practises	(*)Avaliarase no exame escrito da materia	6	CG1 CG6 CG8 CG9 CG10 CG11 CG13 CG16 CE12 CT6
Practice in computer rooms	(*)Avaliarase no exame escrito da materia	6	CG1 CG6 CG8 CG9 CG10 CG11 CG13 CG16 CE12 CT6

Other comments on the Evaluation

Sources of information

Basic Bibliography

Complementary Bibliography

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Sevilla Martínez, F., Una teoría ecológica para los montes Ibéricos, 2008. León: IRMA

Cordero Rivera, A. (editor), Proxecto Galicia: Ecoloxía, vol. 44, 2007. A Coruña: Hércules de ediciones

Terradas, J., Ecología de la Vegetación, 2001. Barcelona: Omega

Molles, M.C., Ecology: concepts and applications, 6 (only until 4th edition available on the Library), 2012. McGraw-Hill

Barnes, B. V., Zak, D. R., Denton, S. R. & Spurr, S. H., Forest Ecology, 4, 1998. New York: John Wiley and Sons

Begon, M., Harper, J. L. & Townsend, C. R., Ecología, 1999. Barcelona: Omega

Rico Boquete, E., Política Forestal e Repoboacións En Galicia. 1941-1971, 1995. Santiago de Compostela: Universidade de Sant

Recommendations

Subjects that continue the syllabus

Management of protected areas and biodiversity/P03G370V01801

Subjects that it is recommended to have taken before

Botany/P03G370V01303

Edaphology/P03G370V01302

Mathematics: Statistics/P03G370V01301

Forest entomology and Zoology/P03G370V01305

IDENTIFYING DATA**Topography, remote sensing and geographic information systems**

Subject	Topography, remote sensing and geographic information systems			
Code	P03G370V01403			
Study programme	(*)Grao en Enxeñaría Forestal			
Descriptors	ECTS Credits	Type	Year	Quadmester
	9	Mandatory	2nd	2nd
Teaching language				
Department				
Coordinator	Lorenzo Cimadevila, Henrique			
Lecturers	Lorenzo Cimadevila, Henrique			
E-mail	hlorenzo@uvigo.es			
Web	http://faitic.uvigo.es/			
General description	(*)Trátase dunha materia que versa sobre os instrumentos e métodos utilizados para a realización de medición de precisión sobre o terreo e a súa representación a escala. Se abordan tamén as novas metodoloxías de adquisición e xestión de datos espaciais mediante SIX e Teledetección.			

Competencies

Code		Typology
CG5	CG-05: Capacidade para comprender os seguintes fundamentos necesarios para o desenvolvemento da actividade profesional: Dos sistemas de representación.	• know • Know How
CG7	CG-07: Capacidade para identificar os diferentes elementos: elementos físicos.	• know • Know How
CG21	(*)CG-21: Capacidade para medir, inventariar e avaliar os recursos forestais.	• Know How
CG37	CG-37: Capacidade para redactar informes técnicos.	• Know How
CG39	CG-39: Capacidade para redactar valoracións.	• Know How
CG40	CG-40: Capacidade para redactar peritaxes.	• Know How
CG41	CG-41: Capacidade para redactar taxacións.	• Know How
CE16	(*)CE-16: Capacidade para coñecer, comprender e utilizar os principios de: topografía e reformulacións. Sistemas de información xeográfica e teledetección. Programas informáticos de tratamento de datos espaciais.	• know • Know How
CT2	(*)CBI 2: Capacidade de organización e planificación.	• Know How
CT4	(*)CBI 4: Coñecementos básicos de informática.	• know
CT6	(*)CBI 6: Adquirir capacidade de resolución de problemas.	• Know How
CT7	(*)CBI 7: Adquirir capacidade na toma de decisións.	• Know How
CT8	(*)CBP 1: Capacidades de traballo en equipo, con carácter multidisciplinar e en contextos tanto nacionais como internacionais.	• Know be
CT9	(*)CBP 2: Habilidades nas relacións interpersoais.	• Know be
CT13	(*)CBS 1: Aprendizaxe autónoma.	• Know How
CT16	(*)CBS 4: Liderado.	• Know be

Learning outcomes

Learning outcomes	Competences
(*)	CG5 CG7 CG21 CG37 CG39 CG40 CG41 CE16 CT2 CT4 CT6 CT7 CT8 CT9 CT13 CT16

New

Contents	
Topic	
Topography	- Introduction to Geodesy and Cartography - Instruments - Methods: radiation, itineraries, intersecting - Stake
Remote sensing	- Physical fundamentals - Sensors and Platforms - Digital image processing - Applications
Geographic information systems	- SIX concept - Models and Data Structures - Vector GIS - SIG raster - Insert digital terrain modes

Planning			
	Class hours	Hours outside the classroom	Total hours
Troubleshooting and / or exercises	25	50	75
Seminars	3	3	6
Master Session	1	1	2
Troubleshooting and / or exercises	3	3	6
Laboratory practises	10	20	30
Practice in computer rooms	16	32	48
Master Session	20	40	60
Short answer tests	1	0	1
Practical tests, real task execution and / or simulated.	3	0	3
Reports / memories of practice	10	0	10

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies	
	Description
Troubleshooting and / or exercises	Activity which formulated problem and / or exercises related to the course. The student should develop appropriate solutions or right through the exercise routines, application of formulas or algorithms, application processing procedures available information and interpretation of the results. It is often used to complement the lecture.
Seminars	Activities focused to work on a specific topic, allowing delve or supplement the contents of the field. They can be used to supplement the lectures.
Master Session	Presentation by the teacher of the contents on the subject under study, theoretical and / or guidelines for a job, exercise or project to be developed by the student.
Troubleshooting and / or exercises	Activity which formulated problem and / or exercises related to the course. The student should develop appropriate solutions or right through the exercise routines, application of formulas or algorithms, application processing procedures available information and interpretation of the results. It is often used to complement the lecture.
Laboratory practises	Activities application of knowledge to specific situations and basic skills acquisition and related procedural matter under study. Special spaces are developed with specialized equipment (scientific and technical laboratories, languages, etc.).
Practice in computer rooms	Activities application of knowledge to specific situations, and the acquisition of basic skills and procedural matters related to the object of study, which are held in computer rooms.
Master Session	Presentation by the teacher of the contents on the subject under study, theoretical and / or guidelines for a job, exercise or project to be developed by the student.

Personalized attention	
Methodologies	Description
Master Session	
Troubleshooting and / or exercises	
Seminars	
Laboratory practises	
Tests	Description
Reports / memories of practice	

Assessment			
	Description	Qualification	Evaluated Competences
Master Session	(*)Exame teórico	20	CG5 CG7 CG21 CE16
Troubleshooting and / or exercises	(*)Exame práctico	30	CG5 CG7 CE16 CT2 CT4 CT6 CT13
Short answer tests	(*)Proba tipo test	10	CG5 CG7 CE16
Practical tests, real task execution and / or simulated.	(*)Traballo práctico	40	CG5 CG7 CG21 CG37 CG39 CG40 CG41 CE16 CT2 CT4 CT6 CT7 CT8 CT9 CT13 CT16

Other comments on the Evaluation

Sources of information

Basic Bibliography

Complementary Bibliography

Recommendations

IDENTIFYING DATA				
Hydraulics				
Subject	Hydraulics			
Code	P03G370V01404			
Study programme	(*)Grao en Enxeñaría Forestal			
Descriptors	ECTS Credits	Type	Year	Quadmester
	9	Mandatory	2nd	2nd
Teaching language				
Department				
Coordinator	Martínez Chamorro, Enrique José			
Lecturers	Martínez Chamorro, Enrique José			
E-mail	enrique.martinez.chamorro@gmail.com			
Web	http://http://webs.uvigo.es/mchamorro/			
General description	<p>(*)1. Hidrostática. Ecuación fundamental de la hidrostática. Centro de presión. Fuerza de presión sobre superficies planas y curvas. Principio de Arquímedes.</p> <p>2. Hidrodinámica. Ecuación de continuidad. Ecuación de Bernouilli generalizada. Potencia de una máquina hidráulica. Ecuación de la cantidad de movimiento en régimen permanente.</p> <p>3. Transporte de agua en conducciones cerradas: tuberías. Pérdidas de carga continuas y singulares. Ecuación de Darcy-Weissbach. Timbraje en tuberías. Tuberías en serie y en paralelo.</p> <p>4. Régimen no estacionario de los líquidos en tuberías. Golpe de ariete. Cálculo de sobrepresiones.</p> <p>5. Diseño hidráulico en tuberías especiales para riego. Cálculo de ramales principales y laterales.</p> <p>6. Elevación e impulsión de líquidos mediante bombas hidráulicas. Curvas características. Elección de bombas.</p> <p>7. El ciclo hidrológico I: precipitación, interceptación y evapotranspiración.</p>			

Competencies		
Code		Typology
CG2	CG-02: Capacidade para comprender os seguintes fundamentos necesarios para o desenvolvemento da actividade profesional: Físicos.	• know • Know How
CG26	CG-26: Coñecementos das seguintes materias necesarios tanto para a xestión dos sistemas forestais como para a súa conservación: hidráulica.	• know
CE9	(*)CE-09: Capacidade para coñecer, comprender e utilizar os principios de: hidráulica forestal; hidroloxía e restauración hidrolóxico-forestal.	• know • Know How
CT6	(*)CBI 6: Adquirir capacidade de resolución de problemas.	• Know How

Learning outcomes	
Learning outcomes	Competences
(*)	CG2 CG26 CE9 CT6
New	

Contents	
Topic	
Subject 1	Physical properties of liquids. Concept and properties of hydrostatic pressure. Systems of measurements. Units
Subject 2.	Basic equation of the hydrostatic. Hydrostatic pressure force on flat and curved surfaces. Pressure center. Archimedes' principle
Subject 3.	Design and calculation of dikes in forest hydrology: Forces acting. Conditions of stability. Dimensioning. Design of small dams. Concrete dams and glazed masonry
Subject 4.	Current regimes. Concepts used in the definition of movement. Flow and average speed. Continuity equation. Dynamics of perfect liquids. Equation of the amount of movement in steady state. Equation of Bernouilli. Permanent movement. Graphical representation of the Bernouilli equation. Emptying time of a deposit

Subject 5.	Generalized Bernoulli equation. Loss of load. Power of liquid current in a section. Extension of the Bernoulli equation to permanent real currents. Hydraulic machines: turbines and pumps. Power of a hydraulic machine.
Subject 6.	Measurement of capacity in watercourses: Landfills. Types. Classification. General equation of expenditure. Thin wall dumps. Landfills in thick wall. Flow gauging devices in forest basins.
Subject 7.	Water transport in closed pipes. Reynolds number. Boundary layer Laminar and turbulent regimes in pipes. Continuous load losses. Darcy-Weisbach equation. Coefficient of friction. Diagram of Moody. Monomial exponential empirical formulas. Unique or secondary loss of load. Coefficients k for their estimation. Method of length of equivalent pipe.
Subject 8.	Calculation of pipelines. General conditions. Calculation of a siphon. Timbre in pipes. Simple piping in series, in parallel. Introduction to the calculation of branched pipes.
Subject 9.	Non-stationary regime of liquids in pipes. Water hammer. Description of the phenomenon. Calculation of overpressures. Close quick. Allievi's formula. Slow closing. Michaud's formula. Methods of attenuation.
Subject 10.	Hydraulic design in special pipes for irrigation. Characteristic curves of the emitters. Pipes with discrete flow distribution. Criteria and calculation for the dimensioning of a side of sprinklers. Drip irrigation ditto
Subject 11.	Lifting and discharge of liquids by hydraulic pumps I. Classification of hydraulic pumps. Centrifugal pumps. Geometric and elevation heights of elevation. Characteristic curve. Powers and yields. Loss of energy. Suction height. NPSH Factor. Non-cavitation condition.
Subject 12.	Lifting and flow of liquids using hydraulic pumps II. Characteristic curves of rotodynamic pumps at constant speed. Operating point. Couplings. Formulas of similarity. General characteristics curves at different speeds. Choice of pumps.
Subject 13.	Flow in open channels. Permanent and uniform movement. Vertical velocity distribution. Normal draft. Gradually varied permanent movement. Specific energy. Depth, speed and specific energy critical. Hydraulic overhang.
Subject 14.	Hydrological cycle. Forest action on water regulation. Physical parameters of the hydrological basin. Soil and climate. Forest action on water regulation. Hydric balance. Criteria for restoring forest hydrological degraded areas.

Planning

	Class hours	Hours outside the classroom	Total hours
Troubleshooting and / or exercises	30	45	75
Laboratory practises	10	10	20
Autonomous troubleshooting and / or exercises	0	60	60
Master Session	20	20	40
Troubleshooting and / or exercises	4	26	30

*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies

	Description
Troubleshooting and / or exercises	Activity which formulated problem and / or exercises related to the course. The student should develop appropriate solutions or right through the exercise routines, application of formulas or algorithms, application processing procedures available information and interpretation of the results. It is often used to complement the lecture.
Laboratory practises	Activities application of knowledge to specific situations and basic skills acquisition and related procedural matter under study. Special spaces are developed with specialized equipment (scientific and technical laboratories, languages, etc.).
Autonomous troubleshooting and / or exercises	Actividade in which problems are formulated and / or exercises related to the course. The student must develop the analysis and resolution of problems and / or exercises independently.
Master Session	Presentation by the teacher of the contents on the subject under study, theoretical and / or guidelines for a job, exercise or project to be developed by the student.

Personalized attention

Methodologies	Description
Autonomous troubleshooting and / or exercises	

Assessment			
	Description	Qualification	Evaluated Competences
Autonomous troubleshooting and / or exercises	(*)Planteamiento de problemas que el alumno debe resolver de forma personalizada fuera de clase a lo largo del curso	30	CG2 CG26 CE9 CT6
Troubleshooting and / or exercises	(*)Planteamiento de problemas que el alumno debe resolver en clase en el acto de evaluación	70	CG2 CG26 CE9 CT6

Other comments on the Evaluation

Sources of information

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Complementary Bibliography

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Recommendations

Subjects that it is recommended to have taken before

- Physics: Physics I/P03G370V01102
- Physics: Physics II/P03G370V01202
- Mathematics: Overview of mathematics/P03G370V01203
- Mathematics: Mathematics and IT/P03G370V01103