



## (\*)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: [sdeuetf@uvigo.es](mailto:sdeuetf@uvigo.es)
7. Web: <http://www.forestales.uvigo.es>



### Faculty Management

#### Managerial team:

Director: D. Enrique Valero Gutiérrez del Olmo

Deputy director: D<sup>a</sup>. 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](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
<b>SUMA</b>	<b>813</b>	<b>438</b>

### Laboratorios e talleres:

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

2º	Lab. Enxeñaría Eléctrica	110,73 m <sup>2</sup>	21	NO	NO
2º	Lab. Enxeñaría Química	109,98 m <sup>2</sup>	15	27,40 m <sup>2</sup>	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)

[http://www.uvigo.es/uvigo\\_gl/administración/servicioalumnado](http://www.uvigo.es/uvigo_gl/administración/servicioalumnado)

<http://extension.uvigo.es>

[http://webs.uvigo.es/vicoap/normativa\\_oa.gl.htm](http://webs.uvigo.es/vicoap/normativa_oa.gl.htm)

[http://www.uvigo.es/uvigo\\_gl/estudiostitulaciones](http://www.uvigo.es/uvigo_gl/estudiostitulaciones)

[http://www.uvigo.es/uvigo\\_gl/vidauniversitaria/calendarioescolar](http://www.uvigo.es/uvigo_gl/vidauniversitaria/calendarioescolar)

[http://www.uvigo.es/uvigo\\_gl/vidauniversitaria/universidadvirtual](http://www.uvigo.es/uvigo_gl/vidauniversitaria/universidadvirtual)

[http://secxeral.uvigo.es/secxeral\\_gl/normativa/normativauniversidad/estudaintes/regulamento\\_estudiantes.html](http://secxeral.uvigo.es/secxeral_gl/normativa/normativauniversidad/estudaintes/regulamento_estudiantes.html)

[http://www.uvigo.es/uvigo\\_gl/vidauniversitaria/normativa](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/](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/](http://www.uvigo.es/uvigo_gl/vidauniversitaria/comedores_aloxamento/)
- **Other activities:**
  - [http://www.campuspontevedra.uvigo.es/index.php?\\*id=14](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 3rd**

Code	Name	Quadmester	Total Cr.
P03G370V01501	Forest constructions	1st	6
P03G370V01502	Forestry machinery	1st	6
P03G370V01503	Projects	1st	6
P03G370V01504	Environmental Impact	1st	6
P03G370V01505	Forest certification and legislation	1st	6
P03G370V01601	Use of forests	2nd	6
P03G370V01602	Dasometry	2nd	6
P03G370V01603	Repopulation	2nd	6
P03G370V01604	Forestry hydrology	2nd	6
P03G370V01605	Forest management	2nd	6
P03G370V01606	Wood technology	2nd	6
P03G370V01607	Xylo energy	2nd	6
P03G370V01609		2nd	6

IDENTIFYING DATA				
Forest constructions				
Subject	Forest constructions			
Code	P03G370V01501			
Study programme	(*)Grao en Enxeñaría Forestal			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	3rd	1st
Teaching language	Spanish Galician			
Department				
Coordinator	Riveiro Rodríguez, Belén			
Lecturers	Pece Montenegro, Santiago Riveiro Rodríguez, Belén			
E-mail	belenriveiro@uvigo.es			
Web	<a href="http://http://faitic.uvigo.es/index.php/es/">http://http://faitic.uvigo.es/index.php/es/</a>			
General description	(*)Principios, Coñecementos e Normas nos que se fundamentan as Construcións Forestais e o deseño de Vías Forestais			

Competencies	
Code	
B7	Ability to solve technical problems derived from the management of natural spaces.
B9	Knowledge of hydraulics, construction, electrification, forest roads, machinery and mechanization necessary both for the management of forest systems and for their conservation.
C18	Ability to know, understand and use the principles of: forest constructions and forest roads.
D1	Ability to understand the meaning and application of the gender perspective in the different fields of knowledge and in professional practice with the aim of achieving a more just and egalitarian society
D2	Ability to communicate orally and written in Spanish or in English
D4	Sustainability and environmental commitment
D5	Capacity for information management, analysis and synthesis
D6	Organization and planning capacity
D7	Skill in the use of IT tools and ICTs.
D8	Ability to solve problems, critical reasoning and decision making
D9	Teamwork skills, skills in interpersonal relationships and leadership.
D10	Autonomous Learning

Learning outcomes	
Expected results from this subject	Training and Learning Results

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.	B7	C18	D1
4R. 2018 Capacity to #analyze products, processes and complex systems in the his field of study; choose and apply analytical methods, of calculation and experimental *relevantes of form *relevante and interpret correctly the results of these analyses.			D2
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.			D4
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.			D5
9R. 2018 Capacity to consult and apply codes of good practices and security of the his speciality.			D6
11R. 2018 Understanding of the techniques and methods of analysis, project and applicable investigation and his limitations within the scope of the his speciality.			D7
12R. 2018 practical Competition to resolve complex problems, realize complex projects of engineering and realize specific investigations stop his speciality.			D8
13R. 2018 Knowledge of the application of materials, teams and tools, technological processes and of engineering and his limitations within the scope of the his speciality.			D9
14R. 2018 Capacity to apply norms of engineering in the his speciality.			D10
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.			
18R. 2018 Capacity to manage activities or technical projects or complex professionals of the his speciality, assuming the responsibility of the takes of decisions.			
20R. 2018 Capacity to work effectively in national and international contexts, individually and in team, and cooperate with the engineers and people of other disciplines.			

## Contents

### Topic

1.- Previous concepts of mechanics and principles of materials resistance.	1.- Moment of a force, Balance of a body, Diagram of the Free Body, Reactions, Unions and supports. 2.- Centers of gravity, centroid, first-order static moment, moment of inertia, spinning radius. 3.- Forces distributed 4.- Curtains 5.- General principles and definitions of the Resistance of Materials.
2.- The elastic solid	1.- Tension state of a point, intrinsic components of tension, stress matrix, stresses, strain matrix. 2.- Diagrams of solicitations. 3.- Introduction to Hyperstaticity, degree of hyperstability, Compatibility Equations of Deformations.
3.- Axial Efforts. Traction-Compression	1.- Traction test of ductile materials. 2.- The elastic regime. Young's Modulus, Poisson's Coefficient. 3.- Uniaxial tensile strain. 4.- Hyperstaticity in bars subjected to axial stress.
4.- Introduction to the Cut	1.- Cutting voltage, angular distortion, Rigidity module. 2.- Joints: screws and rivets. 3.- Types of failure in joints by shear stress.
5.- Introduction to Twisting	1.- Elementary theory of torsion in prisms of circular section. 2.- Tension and strain analysis, turning angle.
6.- Introduction to Flexion	1. Beams: definition and classes. Applied forces 2.- Cutting force and bending moment 3.- Relations between shear, bending and load 4.- Cutting and bending diagrams 5.- Types of flexion. Hypothesis and limitations 6.- Normal stresses. Law of Navier 7.- Concept of resistant module 8.- Bending deformations: Differential Equation of the Elastic, Theorems of Mohr. 9.- Hyperelastic Flexing

7- Introduction to Buckling	1.- Buckling instability. 2. Euler's critical load. 3.- Limit of application of the formula of Euler, mechanical slenderness, efficient sections.
8.- Introduction to the analysis of structures	1.- Reticulated structures. 2.- Porticos, semipórticos and pictures. 3.- Initiation to the matrix calculation. 4.- Limit States. 5.- Degrees of Freedom.
9.- Constructive elements: metallic, cement, concrete, wood.	1.- Foundations. Land. 2.- Cement and Concrete. 3.- Industrial Warehouses.
10.- Obligatory standards in construction.	1.- Standards obliged to comply. Building Technical Code. 2.- Eurocode.
11.- Forest roads	1.- Land analysis and soil improvement. 2.- Planning of Roads
12.- Construction Projects	1.- Calculation Systems and Budget. 2.- Systems of contracting and control of works. Pert, Gant. 3.- Quality control of buildings. 4.- Prevention Plan. 5.- Principles of Maintenance.

## Planning

	Class hours	Hours outside the classroom	Total hours
Introductory activities	1	1	2
Lecturing	21	42	63
Problem solving	11	22	33
Computer practices	9	27	36
Essay	1	8	9
Objective questions exam	1	2	3
Essay questions exam	2	2	4

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

## Methodologies

	Description
Introductory activities	Efforts to make contact and gather information about the students, and to present the subject.
Lecturing	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.
Problem solving	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.
Computer practices	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.

## Personalized assistance

Methodologies	Description
Problem solving	The students will come to the teachers to clarify the concepts necessary to perform the problems and / or exercises performed in the classroom, as well as to clarify / discuss any doubts that may appear after the end of the sessions.
Tests	Description
Essay	Students will be able to use face-to-face tutoring, or teledocence tools for correct tutoring by teachers in terms of carrying out work / projects.

## Assessment

	Description	Qualification	Training and Learning Results
Essay	Along the course students will develop small projects where they will tackle exercises and cases of study that complement the practical sessions. They will serve to verify the acquisition of the competitions CE-18, CG7, CT5, CT6, CT7, CT8, CT9 and CT10.	15	

Objective questions exam	Several tests will take place along the course to verify that the student is acquiring the competences CE-18 and CG9.	10
Essay questions exam	Final written exam to verify competences CE-18, CG7, CG9, CT1, CT2, CT4, CT5, CT6, CT7, CT8, CT9, CT10.	75

### Other comments on the Evaluation

The evaluation tests corresponding to "Essays", as well as "Objective questions exam" are framed within the continuous evaluation tests of the subject, whose weight on the total of the subject is 25%. All students must complete a "Final Exam", with a weight on the overall evaluation of 75%. It will be necessary to reach a minimum grade of 4.5 points out of 10 in the exam, so that the continuous assessment grade is added. The student must obtain a final grade equal to or greater than 5 points out of 10 in order to pass the subject.

Those students who officially renounce continuous assessment, will be evaluated in a single final written exam, assuming in this case 100% of the score.

The final evaluation will be held on the official dates approved by the Forest Engineering School. There will be two evaluation opportunities: 1st opportunity, on 01.13.2020 at 16:00h; 2nd opportunity, on 06/24/2020, at 16:00h. Also, students who enroll in the call for "Final de Carrera", will have the final evaluation on 23/09/2019, at 9:00 am.

The official dates and potential changes are published in the main board of the School and at the website <http://forestales.uvigo.es/gl/>

### Sources of information

#### Basic Bibliography

#### Complementary Bibliography

M. Vázquez, **RESISTENCIA DE MATERIALES**, 4,

P. Jiménez Montoya, **HORMIGÓN ARMADO**, 1,

Rafael Dal-Ré Tenreiro, **CAMINOS RURALES. PROYECTO Y CONSTRUCCIÓN**, 1,

MINISTERIO DE FOMENTO, **CODIGO TECNICO DE EDIFICACION**, 1,

Ferdinand P. Beer, **MECÁNICA DE MATERIALES**, 1,

### Recommendations

#### Subjects that continue the syllabus

Hydraulics/P03G370V01404

Use of forests/P03G370V01601

Environmental Impact/P03G370V01504

Forest Fires/P03G370V01802

Primary wood processing industries/P03G370V01706

#### Subjects that are recommended to be taken simultaneously

Forest certification and legislation/P03G370V01505

Forestry machinery/P03G370V01502

Projects/P03G370V01503

#### Subjects that it is recommended to have taken before

Graphic expression: Graphic expression and cartography/P03G370V01101

Physics: Physics II/P03G370V01202

Mathematics: Overview of mathematics/P03G370V01203

Mathematics: Mathematics and IT/P03G370V01103

Chemistry: Chemistry/P03G370V01204

Topography, remote sensing and geographic information systems/P03G370V01403



IDENTIFYING DATA				
Forestry machinery				
Subject	Forestry machinery			
Code	P03G370V01502			
Study programme	(*)Grao en Enxeñaría Forestal			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	3rd	1st
Teaching language				
Department				
Coordinator	Diz Montero, Rubén			
Lecturers	Diz Montero, Rubén			
E-mail	rubendiz@uvigo.es			
Web				
General description	In this **asignatura pretends that he student *purchase *the *essential *knowledges that reads allow to comprise he *operation of woos machines *employed in woos forest *industries, that *know *the types of machines and *installations *more important *and *his *components. *His *knowledge results basic for him *analysis of him *operation, *design *and *construction of woos machines *and of *the teams associated the same *woos, *and in *general woos *industrial *applications in that they are used.			

Competencies	
Code	
B9	Knowledge of hydraulics, construction, electrification, forest roads, machinery and mechanization necessary both for the management of forest systems and for their conservation.
B11	Ability to characterize the anatomical and technological properties of wood and non-timber forest raw materials, as well as the technologies and industries of these raw materials.
C20	Ability to know, understand and use the principles of forestry machinery and mechanization.
D2	Ability to communicate orally and written in Spanish or in English
D5	Capacity for information management, analysis and synthesis
D8	Ability to solve problems, critical reasoning and decision making

Learning outcomes	
Expected results from this subject	Training and Learning Results

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.	B9	C20	D2
3R. 2018 Be conscious of the multidisciplinary context of the engineering.			D5
4R. 2018 Capacity to #analyze products, processes and complex systems in the his field of study; choose and apply analytical methods, of calculation and experimental *relevantes of form *relevante and interpret correctly the results of these analyses.			D8
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.			
9R. 2018 Capacity to consult and apply codes of good practices and security of the his speciality.			
11R. 2018 Understanding of the techniques and methods of analysis, project and applicable investigation and his limitations within the scope of the his speciality.			
12R. 2018 practical Competition to resolve complex problems, realize complex projects of engineering and realize specific investigations stop his speciality.			
13R. 2018 Knowledge of the application of materials, teams and tools, technological processes and of engineering and his limitations within the scope of the his speciality.			
20R. 2018 Capacity to work effectively in national and international contexts, individually and in team, and cooperate with the engineers and people of other disciplines.			
21R. 2018 Capacity to recognize the need of a continuous training and realize this activity of independent way during his professional life.			
22R. 2018 Capacity to be to the day of the scientific and technological news.			

## Contents

Topic	
1. Thermal machines. Generalities	Classification, theoretical appearances and principles of operation. Types of engines employed in forest machines.
2. Study of Thermal Engines	Engines of lit caused. Engines of lit by compression.
3. Study of compressors	Types of compressors. Installations of compression of air and pneumatic circuit.
4. Machinery used in forestry explotatrons.	Types of machines. Hydraulic circuits. Bombs and hydraulic engines
5. Machinery used in forestry industries	Installations and circuits

## Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	29	86	115
Presentation	2	10	12
Laboratory practical	14	6	20
Objective questions exam	1	0	1
Problem and/or exercise solving	2	0	2

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

## Methodologies

	Description
Lecturing	Exhibition by part of the professor of the contents of the matter object of study. Resolution of problems and/or exercises related with the *asignatura
Presentation	Realisation of works in groups on thematic specific and presentation of the same in the classroom
Laboratory practical	Work with real machines in the laboratory to complement the contents of the matter, completed with some practice with specific software. Preparation of memories of practices.

## Personalized assistance

Methodologies	Description
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Lecturing	
Laboratory practical	
Presentation	

Assessment				
	Description	Qualification	Training and Learning Results	
Lecturing	Participation in the class. Proposal of **cuestions of theory justified on the content given.	0	C20	
Presentation	Realisation of works on the content of the **asignatura. Exhibition in the classroom.	20	C20	D5
Laboratory practical	Realisation of practices of laboratory and delivery of memories on the same.	20	C20	D5
Objective questions exam	Resolution of questionnaire of theory type test.	25	C20	D5
Problem and/or exercise solving	Resolution of problems and/or exercises related with the *temario of the **asignatura.	35	C20	D5

#### Other comments on the Evaluation

#### Sources of information

##### Basic Bibliography

##### Complementary Bibliography

Moran J and Shapiro H, **Fundamentos de Termodinámica Técnica**, 2004,

Çengel Y. y Boles M., **Termodinámica**, 7ª edición (2011),

Payri F. y Desantes J.M., **Motores de combustión interna alternativos**, 2011,

Agüera Soriano J., **Termodinámica Lógica y Motores Térmicos**, 1993,

Creus Solé A., **Neumática e Hidráulica**, 2010,

IDAE, **Biomasa : maquinaria agrícola y forestal**, 2007,

#### Recommendations

##### Subjects that continue the syllabus

Primary wood processing industries/P03G370V01706

##### Subjects that it is recommended to have taken before

Physics: Physics I/P03G370V01102

Physics: Physics II/P03G370V01202

Mathematics: Mathematics and IT/P03G370V01103

Hydraulics/P03G370V01404

IDENTIFYING DATA				
<b>Projects</b>				
Subject	Projects			
Code	P03G370V01503			
Study programme	(*)Grao en Enxeñaría Forestal			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	3rd	1st
Teaching language				
Department				
Coordinator	Valero Gutiérrez del Olmo, Enrique María			
Lecturers	Valero Gutiérrez del Olmo, Enrique María			
E-mail	evalero@uvigo.es			
Web	<a href="http://http://fatic.uvigo.es/index.php/es/">http://http://fatic.uvigo.es/index.php/es/</a>			
General description	(*)Esta materia é de carácter eminentemente aplicado e co obxectivo de que os alumnos adquiren os coñecementos básicos mediante a aprendizaxe dos conceptos, terminoloxía, teoría, e metodoloxía necesarios para ser capaz de entender, formular e resolver un proxecto.			

Competencies	
Code	
B13	Ability to design, direct, elaborate, implement and interpret projects and plans, as well as to write technical reports, recognition reports, assessments, appraisals and appraisals.
B14	Ability to understand, interpret and adopt scientific advances in the forest field, to develop and transfer technology and to work in a multilingual and multidisciplinary environment
C22	Ability to know, understand and use the principles of: methodology, organization and project management.
C42	Ability to do an original work to be presented and defended before a university court, consisting of a project in the field of specific technologies of Forest Engineering, of a professional nature in which the competences acquired in the teachings and subjects of the career.
D2	Ability to communicate orally and written in Spanish or in English
D4	Sustainability and environmental commitment
D5	Capacity for information management, analysis and synthesis
D6	Organization and planning capacity
D8	Ability to solve problems, critical reasoning and decision making

Learning outcomes	
Expected results from this subject	Training and Learning Results

3R. 2018 Be conscious of the multidisciplinary context of the engineering.	B13	C22	D2
4R. 2018 Capacity to #analyze products, processes and complex systems in the his field of study; choose and apply analytical methods, of calculation and experimental *relevantes of form	B14	C42	D4
*relevante and interpret correctly the results of these analyses.			D5
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.			D6
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.			D8
7R. 2018 Capacity of the project using any knowledges advanced of the his speciality in engineering.			
9R. 2018 Capacity to consult and apply codes of good practices and security of the his speciality.			
11R. 2018 Understanding of the techniques and methods of analysis, project and applicable investigation and his limitations within the scope of the his speciality.			
12R. 2018 practical Competition to resolve complex problems, realize complex projects of engineering and realize specific investigations stop his speciality.			
13R. 2018 Knowledge of the application of materials, teams and tools, technological processes and of engineering and his limitations within the scope of the 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.			
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

Theme I. The project as a concept	- Definition and philosophy of the project - The project cycle
Theme II. The project as a method. Project engineering	- Project methodology. Reliability study - Preliminary project or preliminary project -Project detailed -Project planning - Socio-economic evaluation of projects -Evaluation of projects -Analysis of risk in the evaluation of projects.
Theme III. The project as document	- Content of project documents -Memory -Blueprints -Technical specifications -Budget -Health and Safety issues
Theme IV. The professional activity and the project	- The contracting of technical assistance for the drafting of projects. -The contest of projects and execution of works -The activity of project engineer -The rates of fees.
Theme V. Forestry projects	- Forest projects - Projects in Forest Industry -Silvicultural and Forest Management Projects -Forest infrastructures - Hunting projects -Fishing projects. -Projects for recreation and public use -Projects for the management of protected areas.

## Planning

	Class hours	Hours outside the classroom	Total hours
Presentation	75	0	75
Project based learning	38	0	38
Discussion Forum	12	0	12
Debate	13	0	13

Objective questions exam	2	0	2
Essay	0	10	10

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

Methodologies	
	Description
Presentation	Exhibition by the students to the teacher and / or a group of students of a subject matter or content of the results of a job, exercise, project ... It can be done individually or in groups.
Project based learning	Performing activities that allow the cooperation of various subjects and students face, working together, to open problems. Allow coaching, among others, the cooperative learning skills, leadership, organizational, communication and strengthening relationships.
Discussion Forum	Activity within a virtual environment in which they discussed various topics related to the academic and / or professional.
Debate	Open discussion between a group of students. You can focus on a topic of subject content, the analysis of a case, the outcome of a project, exercise or problem previously developed a keynote address ...

Personalized assistance	
Methodologies	Description
Presentation	
Project based learning	
Discussion Forum	
Debate	

Assessment		Qualification	Training and Learning Results
	Description		
Presentation	(*) Exames finais, ou por escrito de tipo redacción ou desenvolvemento dun ou varios temas, ou ben de tipo test, ou combinados ou ben, no seu caso exames orais	0	
Project based learning	(*)Realización dun anteproxecto técnico de carácter semi-profesional	40	D2 D6 D8
Objective questions exam	(*)Exames finais, ou por escrito de tipo redacción ou desenvolvemento dun ou varios temas, ou ben de tipo test, ou combinados ou ben, no seu caso exames orais	40	
Essay	(*)Avaliación continua do alumno a través da súa asistencia e participación, tanto nas clases como en debates e foros de discusión	20	D6 D8

## Other comments on the Evaluation

Sources of information	
Basic Bibliography	
Complementary Bibliography	
BERGILLOS MADRID, J.M, <b>Metodología de diseño de proyectos</b> , 1989.,	
DE COS CASTILLO, M, <b>Teoría general del proyecto. Dirección de proyectos</b> , 1995,	
GÓMEZ SENENT, E, <b>Introducción al proyecto</b> , 1989,	
PEÑA, A., <b>Apuntes de Proyectos: Proyectos de Ingeniería y Documento Proyecto.</b> , 1997,	
GÓMEZ SENENT, E., <b>Las fases del proyecto y su metodología.</b> , 1992,	
HEREDIA, R., <b>Dirección integrada de proyecto. Segunda edición</b> , 1995,	
CORZO, M.A., <b>Introducción a la ingeniería de proyectos</b> , 2002,	
TRUEBA, Y., A. CAZORLA y J.J. DE GRACIA, <b>Proyectos empresariales. Formulación y Evaluación</b> , 1995,	
ROMERO, C, <b>Teoría de la decisión multicriterio: conceptos, técnicas y aplicaciones.</b> , 2005,	
PIQUER, J.S, <b>El proyecto en ingeniería y arquitectura</b> , 2003,	
ESCRIVA, I.V., J.L. PEREZ-SALAS y V. SEGURA, <b>Cuadro de precios. Ingeniería agronómica y alimentaria</b> , 1996,	
SAPAG CHAIN, N, <b>Fundamentos de Preparación y Evaluación de Proyectos</b> , 2005,	
MORRILLA ABAD, IGNACIO, <b>Guía metodológica y práctica para la realización de proyectos.</b> , 1998,	

## Recommendations

**Subjects that are recommended to be taken simultaneously**

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Use of forests/P03G370V01601

Forest constructions/P03G370V01501

Forestry hydrology/P03G370V01604

Forest management/P03G370V01605

Repopulation/P03G370V01603

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**Subjects that it is recommended to have taken before**

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Physics: Physics I/P03G370V01102

Physics: Physics II/P03G370V01202

Mathematics: Overview of mathematics/P03G370V01203

Mathematics: Mathematics and IT/P03G370V01103

Botany/P03G370V01303

Electrotechnology and rural electrification/P03G370V01304

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IDENTIFYING DATA				
Environmental Impact				
Subject	Environmental Impact			
Code	P03G370V01504			
Study programme	(*)Grao en Enxeñaría Forestal			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	3rd	1st
Teaching language	Spanish Galician			
Department				
Coordinator	Álvarez Bermúdez, Xana			
Lecturers	Álvarez Bermúdez, Xana			
E-mail	xaalvarez@uvigo.es			
Web				
General description	(*)(*)En esta materia se trata de compatibilizar la actividad humana con el medio ambiente de tal manera que se puedan prever y prevenir los impactos que sobre los diversos factores del medio provocan determinadas actuaciones y/o actividades, tratando de minimizarlos o reducirlos.			

Competencies	
Code	
B1	Ability to understand the biological, chemical, physical, mathematical and representation systems necessary for the development of professional activity, as well as to identify the different biotic and physical elements of the forest environment and renewable natural resources susceptible to protection, conservation and exploitations in the forest area.
B2	Ability to analyze the ecological structure and function of forest systems and resources, including landscapes.
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 .
B4	Ability to evaluate and correct the environmental impact, as well as apply the techniques of auditing and environmental management.
C19	Ability to know, understand and use the principles of: evaluation and correction of environmental impact; recovery of degraded spaces.
D4	Sustainability and environmental commitment
D5	Capacity for information management, analysis and synthesis
D6	Organization and planning capacity
D8	Ability to solve problems, critical reasoning and decision making
D10	Autonomous Learning

Learning outcomes	
Expected results from this subject	Training and Learning Results



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.	B1	C19	D4
3R. 2018 Be conscious of the multidisciplinary context of the engineering.	B2		D5
4R. 2018 Capacity to #analyze products, processes and complex systems in the his field of study; choose and apply analytical methods, of calculation and experimental *relevantes of form *relevante and interpret correctly the results of these analyses.	B3		D6
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.	B4		D8
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.			D10
7R. 2018 Capacity of the project using any knowledges advanced of the his speciality in engineering.			
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.			
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			
20R. 2018 Capacity to work effectively in national and international contexts, individually and in team, and cooperate with the engineers and people of other disciplines.			

## Contents

Topic	
Subject 1.	Concepts and concepts: Environment and environmental management.
Subject 2.	History and environmental regulations in Europe. Environmental action plans of the European Union.
Subject 3.	Environmental management in the public sector. Environmental Plans. Global plans. Sectoral plans.
Subject 4.	Environmental legislation: In the European Union, in Spain, in the Autonomous Communities.
Subject 5.	Environment and Natural environment. Environmental factors. Actions and activities that produce impacts.
Subject 6.	Sustainable development. Renewal rate, assimilation capacity and host capacity.
Subject 7.	Impact of a project or activity. Impact on the different phases of the project.
Subject 8.	Indicators of impact. Biological indicators.
Subject 9.	Typology of impacts. Cataloging and classification of environmental impacts.
Subject 10.	Types of environmental impact assessment.
Subject 11.	EIA process. Administrative process and content of the EIA. Declaration of Environmental Impact.
Subject 12.	Environmental impact studies: content and process.
Subject 13.	Studies of project actions that can cause impacts.
Subject 14.	Environmental inventory and factors susceptible of affection.
Subject 15.	Identification and assessment of impacts. Techniques and methods.
Subject 16.	Qualitative methods and quantitative methods.
Subject 17.	Corrective and protective measures. Environmental monitoring plans. Environmental control plans.
Subject 18.	Eco audits and environmental audits.
Subject 19.	Degraded areas: landfills, tailings, slopes, mines, etc. Recovery work.
Subject 20.	Civil works for the regeneration and environmental actions and of restoration and recovery.
Subject 21.	Revegetation and planting.
Subject 22.	Hidrosiembra

## Planning

	Class hours	Hours outside the classroom	Total hours
Mentored work	37	0	37

Laboratory practical	20	0	20
Case studies	30	0	30
Mentored work	60	0	60
Objective questions exam	1	0	1
Essay	2	0	2

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

Methodologies	
	Description
Mentored work	The student, individually or in groups, prepares a paper on the subject of matter or prepare seminars, research, memoirs, essays, summaries of readings, lectures, etc.. Generally it is an autonomous activity / of the student / s that includes finding and collecting information, reading and literature management, writing ...
Laboratory practical	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.).
Case studies	Analysis of an event, issue or actual event in order to know, interpret, solve, generate hypotheses, comparing data, reflect, complete knowledge, diagnose and training in alternative dispute resolution procedures.
Mentored work	Students develop exercises or classroom projects under the guidance and supervision of the teacher. May link autonomous development of student activities.

### Personalized assistance

Methodologies	Description
Mentored work	
Mentored work	
Laboratory practical	
Case studies	
Tests	Description
Objective questions exam	
Essay	

### Assessment

	Description	Qualification	Training and Learning Results
Mentored work	(*)Valórase por parte do profesor a dedicación do alumno, o interese e o desenvolvemento dos traballos, a súa valoración realízase o a avaliación final do estudo de casos presentado Avalíanse as competencias básicas CB1 e CB2, as xerais CG6, CG7, CG8, CG9, CG13, CG14, CG17, CG18 e CG19, a específica CE19 (CE 19.1 a 19.19) e as transversais CT1, CT2, CT11, CT14, CT15 e CT20	0	
Laboratory practical	(*)Valórase a asistencia e participación de forma conxunta cos traballos de aula Avalíanse as competencias básicas CB1 e CB2, as xerais CG6, CG7, CG8, CG9, CG13, CG14, CG17, CG18 e CG19, a específica CE19 (CE 19.1 a 19.19) e as transversais CT1, CT2, CT11, CT14, CT15 e CT20	0	
Case studies	(*)O traballo é valorado e avaliado polos propios compañeiros tras a presentación do mesmo e polo profesor quen terá en consideración todos os factores sinalados no apartado de traballos tutelados Avalíanse as competencias básicas CB1 e CB2, as xerais CG6, CG7, CG8, CG9, CG13, CG14, CG17, CG18 e CG19, a específica CE19 (CE 19.1 a 19.19) e as transversais CT1, CT2, CT11, CT14, CT15 e CT20	0	
Mentored work	(*)Valórase a asistencia e participación con seguimento individual dos alumnos Avalíanse as competencias básicas CB1 e CB2, as xerais CG6, CG7, CG8, CG9, CG13, CG14, CG17, CG18 e CG19, a específica CE19 (CE 19.1 a 19.19) e as transversais CT1, CT2, CT11, CT14, CT15 e CT20	0	
Objective questions exam	(*)Realízase unha proba tipo test e de resposta longa ao final da materia a modo de exame final sobre o contido do temario que se desenvolveron no curso e sobre as materias das visitas e prácticas Avalíanse as competencias básicas CB1 e CB2, as xerais CG6, CG7, CG8, CG9, CG13, CG14, CG17, CG18 e CG19, a específica CE19 (CE 19.1 a 19.19) e as transversais CT1, CT2, CT11, CT14, CT15 e CT20	70	

Essay	(*)O traballo presentado deberá ter unha parte importante de contido técnico e valorarase a súa innovación en canto a temática e desenvolvemento, A súa avaliación será incluída no estudo de casos. A valoración adicional será consecuencia da obtención dos obxectivos expostos inicialmente avalíanse as competencias básicas CB1 e CB2, as xerais CG6, CG7, CG8, CG9, CG13, CG14, CG17, CG18 e CG19, a específica CE19 (CE 19.1 a 19.19) e as transversais CT1, CT2, CT11, CT14, CT15 e CT20	30
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#### Other comments on the Evaluation

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#### Sources of information

##### Basic Bibliography

##### Complementary Bibliography

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#### Recommendations

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**IDENTIFYING DATA****Forest certification and legislation**

Subject	Forest certification and legislation			
Code	P03G370V01505			
Study programme	(*)Grao en Enxeñaría Forestal			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	3rd	1st
Teaching language				
Department				
Coordinator	Álvarez Bermúdez, Xana			
Lecturers	Álvarez Bermúdez, Xana			
E-mail	xaalvarez@uvigo.es			
Web	http://www.faitic.uvigo.es			
General description	(*)Los futuros técnicos forestales deben conocer la legislación que les afecta y para ello deben conocer desde el inicio los procesos de tramitación y los Organismos que legislan y ejecutan las leyes.			

**Competencies**

Code	
B1	Ability to understand the biological, chemical, physical, mathematical and representation systems necessary for the development of professional activity, as well as to identify the different biotic and physical elements of the forest environment and renewable natural resources susceptible to protection, conservation and exploitations in the forest area.
B2	Ability to analyze the ecological structure and function of forest systems and resources, including landscapes.
B10	Ability to apply the techniques of forest management and land planning, as well as the criteria and indicators of sustainable forest management within the framework of forest certification procedures.
C25	Ability to know, understand and use the principles of: forest legislation and certification; sociology and forestry policy.
D4	Sustainability and environmental commitment
D5	Capacity for information management, analysis and synthesis
D6	Organization and planning capacity
D8	Ability to solve problems, critical reasoning and decision making
D9	Teamwork skills, skills in interpersonal relationships and leadership.
D10	Autonomous Learning

**Learning outcomes**

Expected results from this subject	Training and Learning Results		
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.	B1 B2 B10	C25	D4 D5 D6
3R. 2018 Be conscious of the multidisciplinary context of the engineering.			D8
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.			D9 D10
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.			
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.			
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			
20R. 2018 Capacity to work effectively in national and international contexts, individually and in team, and cooperate with the engineers and people of other disciplines.			
21R. 2018 Capacity to recognize the need of a continuous training and realize this activity of independent way during his professional life.			
22R. 2018 Capacity to be to the day of the scientific and technological news.			

**Contents**

BASIC LEGISLATION I	<p>1.- Right: The concept of law, Classification, sources and basic principles in Spanish legal framework.</p> <p>2.- Spanish Constitution: Study as a whole, Principles, spanish constitution, reform constitutional.</p> <p>3.- Congress and Senate: Elaboration of laws, Electoral law, prerogatives of Members and Senators, the congress of deputies (Composition, election, mandate, duration, Functions, etc.), the senate (composition, election, Mandate, duration, functions, etc.).</p> <p>4.- Galician Parliament: Background, Parliamentary study as a whole, initiative Legislation, competition from Galicia, Galicia, sources of autonomic law.</p> <p>5.- The European Union: Objectives of the U.E., Evolution, institutions, sources and principles.</p> <p>6.- Organization of the state: Municipalities, Provinces and autonomous communities.</p> <p>7.- Judicial branch and other institutions: Introduction, division of powers, defender of Town, general council of the judiciary, Courts, hearing and other institutions.</p> <p>8.- Relations between citizens and Public administrations: Introduction, law Administrative, administrative act, classes, phases Of the procedure, administrative remedies. The Law of administrative procedure.</p>
LEGISLATION II	<p>9.- Contracts Law: Classes, forms of contracting, Content and effects of contracts Administrative, compliance with contracts Administrative, resolution, termination and resignation.</p> <p>10.- Forest property: Concept of property, Legal concept of the hill, classification of the hill.</p> <p>11.- Law of mountains: Complete study of the Law Forest fires (43/2003 and 10/2006).</p> <p>12.- Development of the law at the regional level: Proposed draft of the new Mountains of Galicia.</p> <p>13.- Neighborhood forests in common hand: Legislation, concept, characteristics, process Legalization, organization, statutes, administration.</p> <p>14.- Other forest-related laws: Fires. Law of the land bank of Galicia, Decree of the Units of Forest Management.</p> <p>15.- Hunting and fishing legislation. Law of Conservation of biodiversity. Legislation of Natural spaces and conservation of Nature (Natura 2000 Network) and environment. Law of landscape, etc.</p>
FOREST CERTIFICATION	<p>16.- The protection of forests in the world After the 1992 Rio Summit.</p> <p>17.- International Management Initiatives Sustainable Forestry.</p> <p>18.- Ministerial Conferences for the Protection of forests in Europe.</p> <p>19.- Other global processes: Montreal, Tarapoto, dry Africa, etc.</p> <p>20.- Sustainable Forest Management.</p> <p>21.- Forest certification: Processes and Initiatives.</p> <p>22.- Criteria and indicators.</p> <p>23.- UNE 162,000 standards in Spain</p> <p>24.- Current systems more implemented: PEFC and FSC.</p> <p>25.- Practical forms of forest certification.</p>

### Planning

	Class hours	Hours outside the classroom	Total hours
Mentored work	30	0	30
Mentored work	66	0	66
Case studies	30	0	30
Objective questions exam	1	0	1
Laboratory practice	1	0	1
Case studies	1	0	1

Problem and/or exercise solving	1	0	1
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\*The information in the planning table is for guidance only and does not take into account the heterogeneity of the students.

Methodologies	
	Description
Mentored work	The student, individually or in groups, prepares a paper on the subject of matter or prepare seminars, research, memoirs, essays, summaries of readings, lectures, etc.. Generally it is an autonomous activity / of the student / s that includes finding and collecting information, reading and literature management, writing ...
Mentored work	Students develop exercises or classroom projects under the guidance and supervision of the teacher. May link autonomous development of student activities.
Case studies	Analysis of an event, issue or actual event in order to know, interpret, solve, generate hypotheses, comparing data, reflect, complete knowledge, diagnose and training in alternative dispute resolution procedures.

Personalized assistance	
Methodologies	Description
Case studies	
Mentored work	
Mentored work	
Tests	Description
Objective questions exam	
Laboratory practice	
Case studies	
Problem and/or exercise solving	

Assessment			
	Description	Qualification	Training and Learning Results
Mentored work	(*)Valórase por parte do profesor a dedicación do alumno, o interese e o desenvolvemento dos traballos, a súa valoración realízase o a avaliación final do estudo de casos presentado Se evalúan as competencias básicas CB1 e CB2, as xerais CG08, CG09 e CG3, a específicas CE25 (CE 25.1 a 25.19) e as transversais CBI1, CBI2, CBP4, CBS2, CBS3 e CBS 8.	0	
Mentored work	(*)Valórase a asistencia e participación con seguimento individual dos alumnos Se evalúan as competencias básicas CB1 e CB2, as xerais CG08, CG09 e CG3, a específicas CE25 (CE 25.1 a 25.19) e as transversais CBI1, CBI2, CBP4, CBS2, CBS3 e CBS 8.	0	
Case studies	(*)Realízanse exposicións orais semanais sobre o tema asignado por grupos ou de forma individual e estas serán avaliadas. Se evalúan as competencias básicas CB1 e CB2, as xerais CG08, CG09 e CG3, a específicas CE25 (CE 25.1 a 25.19) e as transversais CBI1, CBI2, CBP4, CBS2, CBS3 e CBS 8.	30	
Objective questions exam	(*)Realízase unha proba tipo test ao final da materia a modo de exame final sobre o contido do temario que se desenvolveron no curso e sobre as materias das visitas e prácticas. Se evalúan as competencias básicas CB1 e CB2, as xerais CG08, CG09 e CG3, a específicas CE25 (CE 25.1 a 25.19) e as transversais CBI1, CBI2, CBP4, CBS2, CBS3 e CBS 8.	70	
Laboratory practice	(*)Consistirá en traballos de discusión sobre materias do temario que se exporán para debate. Se evalúan as competencias básicas CB1 e CB2, as xerais CG08, CG09 e CG3, a específicas CE25 (CE 25.1 a 25.19) e as transversais CBI1, CBI2, CBP4, CBS2, CBS3 e CBS 8.	0	
Case studies	(*)O traballo é valorado e avaliado polos propios compañeiros tras a presentación do mesmo e polo profesor quen terá en consideración todos os factores sinalados no apartado de traballos tutelados. Se evalúan as competencias básicas CB1 e CB2, as xerais CG08, CG09 e CG3, a específicas CE25 (CE 25.1 a 25.19) e as transversais CBI1, CBI2, CBP4, CBS2, CBS3 e CBS 8.	0	

Problem and/or exercise solving	(*)Resolución de casos prácticos relacionados coas materias do programa. Se evalúan as competencias básicas CB1 e CB2, as xerais CG08, CG09 e CG3, as específicas CE25 (CE 25.1 a 25.19) e as transversais CBI1, CBI2, CBP4, CBS2, CBS3 e CBS 8.	0
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#### Other comments on the Evaluation

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#### Sources of information

##### Basic Bibliography

##### Complementary Bibliography

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#### Recommendations

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IDENTIFYING DATA				
Use of forests				
Subject	Use of forests			
Code	P03G370V01601			
Study programme	(*)Grao en Enxeñaría Forestal			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	3rd	2nd
Teaching language				
Department				
Coordinator	Ortiz Torres, Luis			
Lecturers	Ortiz Torres, Luis			
E-mail	lortiz@uvigo.es			
Web	<a href="http://http://dasometriaweb.blogspot.com.es/">http://http://dasometriaweb.blogspot.com.es/</a>			
General description	<p>(*)Se analizarán los fundamentos básicos de los aprovechamientos forestales madereros para aprender su planificación básica. Asimismo se estudiarán los principales sistemas de aprovechamiento usados en Galicia así como sus rendimientos, costes y normas de seguridad.</p> <p>En la enseñanza de la materia, tres aspectos son fundamentales a desarrollar, según nuestro punto de vista, en la enseñanza de la ciencia forestal: intuición, rigor y creación. La intuición ubica al alumno en el tipo de problemas que se quiere atacar (a través de ejemplos), crea una perspectiva (a menudo a través de la propia historia del problema) y en definitiva genera un interés. El segundo nivel formaliza todas esas intuiciones y las despoja de lo accesorio hasta desentrañar lo esencial. El rigor necesita de la abstracción y es fundamental en la transmisión de conocimientos técnicos. La creación permite construir soluciones propias, prácticas, cuanto antes tenga un contacto forestal y más aprenda de ello, más motivado va a continuar el estudio de la asignatura.</p>			

### Competencies

Code	
B1	Ability to understand the biological, chemical, physical, mathematical and representation systems necessary for the development of professional activity, as well as to identify the different biotic and physical elements of the forest environment and renewable natural resources susceptible to protection, conservation and exploitations in the forest area.
B6	Ability to measure, inventory and evaluate forest resources, apply and develop silvicultural techniques and management of all types of forest systems, parks and recreational areas, as well as techniques for harvesting timber and non-timber forest products
C23	Ability to know, understand and use the principles of forest exploitation and supply of raw materials in the forest industry.
D4	Sustainability and environmental commitment
D5	Capacity for information management, analysis and synthesis
D6	Organization and planning capacity
D8	Ability to solve problems, critical reasoning and decision making
D10	Autonomous Learning

### 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.	B1	C23	D4
4R. 2018 Capacity to #analyze products, processes and complex systems in the his field of study; choose and apply analytical methods, of calculation and experimental *relevantes of form *relevante and interpret correctly the results of these analyses.	B6		D5
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.			D6
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.			D8
7R. 2018 Capacity of the project using any knowledges advanced of the his speciality in engineering.			D10
9R. 2018 Capacity to consult and apply codes of good practices and security of the his speciality.			
11R. 2018 Understanding of the techniques and methods of analysis, project and applicable investigation and his limitations within the scope of the his speciality.			
12R. 2018 practical Competition to resolve complex problems, realize complex projects of engineering and realize specific investigations stop his speciality.			
13R. 2018 Knowledge of the application of materials, teams and tools, technological processes and of engineering and his limitations within the scope of the 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.			
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			
20R. 2018 Capacity to work effectively in national and international contexts, individually and in team, and cooperate with the engineers and people of other disciplines.			

## Contents

### Topic

General information on forestry and its market in the world	Definition and types of use The Forest Products Market The demanda and the companies The supply of forest products in the world
Marketing of wood	Main procedures for the sale and sale of wood Auction and drafting
Techniques, means and procedures of logging	Wood felling and processing Manual tools The chainsaw and other portable machines Automotive Fodder and Processing Machinery Waste treatment machinery (chippers and balers) Pull out of the wood (skider and autoloader) Adapted agricultural tractor Unblocking cables, helicopter and other methods Transport of wood (river, rail, sea and land) Parks for wood storage
Timber harvesting planning	Factors influencing planning Main systems of exploitation Organization of the uses Control systems in the harvests
Prevention of occupational hazards in forestry	The risk assessment Loss in the forestry sector
The environmental impact of harvesting	Main impacts of forestry activity Methodological guide
The use of bark	Cork Ecology The cork market
The use of resins	The use of resins The resin market

## Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	26	63	89
Problem solving	3	11	14

Case studies	6	12	18
Studies excursion	10	18	28
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
Lecturing	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.
Problem solving	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.
Case studies	Analysis of an event, issue or actual event in order to know, interpret, solve, generate hypotheses, comparing data, reflect, complete knowledge, diagnose and training in alternative dispute resolution procedures.
Studies excursion	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.

### Personalized assistance

Methodologies	Description
Problem solving	It is a question of performing a practical work corresponding to a gap in the topics included in the agenda and publicly presenting said work.
Studies excursion	It is a series of practical visits to facilities and mountains

### Assessment

	Description	Qualification	Training and Learning Results
Lecturing	(*)Asistencia e desempeño dedicado ás clases da materia. Se *evalúan as competencias básicas *CB1 e *CB2, as xerais *CG8, *CG18, *CG23, *CG38, *CG39, *CG40 e *CG41, a específicas CE23 (CE 23.1 a 23.10) e as transversais *CBI1, *CBI2, *CBI4, *CBI5, *CBI6, *CBI7, *CBP4, *CBS1, *CBS7.	10	
Case studies	(*)Resolución dun suposto práctico de planificación que o alumno deberá realizar e entregar Se *evalúan as competencias básicas *CB1 e *CB2, as xerais *CG8, *CG18, *CG23, *CG38, *CG39, *CG40 e *CG41, a específicas CE23 (CE 23.1 a 23.10) e as transversais *CBI1, *CBI2, *CBI4, *CBI5, *CBI6, *CBI7, *CBP4, *CBS1, *CBS7.	20	D5 D6
Studies excursion	(*)Asistencia ás saídas e práctica de campo organizadas.	10	
Problem and/or exercise solving	(*)Resposta a preguntas relacionadas co temario Se *evalúan as competencias básicas *CB1 e *CB2, as xerais *CG8, *CG18, *CG23, *CG38, *CG39, *CG40 e *CG41, a específicas CE23 (CE 23.1 a 23.10) e as transversais *CBI1, *CBI2, *CBI4, *CBI5, *CBI6, *CBI7, *CBP4, *CBS1, *CBS7.	60	D6

### Other comments on the Evaluation

### Sources of information

#### Basic Bibliography

#### Complementary Bibliography

TOLOSANA, E. et al, **El aprovechamiento maderero**, Ediciones Mundi-Prensa,  
DALLA-PRIA, E et al, **Manuel d'exploitation forestière. Tome I.et II**, CTBA y ARMEF,  
MONTOYA, J. M., **Los alcornocales**, M.A.P.A. Madrid,  
ZAMORANO, J. L, **Resinar de forma rentable**, I.N.I.A. Madrid,  
ACEMM, **Manual de prevención de riesgos laborales en el sector forestal**, Fundación para la prevención de riesgos laborales. Gobierno de Cantabria,  
AAEF, **Manual de prevención de riesgos laborales en el sector forestal**, Junta de Andalucía,

### Recommendations

#### Subjects that continue the syllabus

Forestry machinery/P03G370V01502

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**Subjects that are recommended to be taken simultaneously**

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Dasometry/P03G370V01602

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**Subjects that it is recommended to have taken before**

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Forestry/P03G370V01401

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IDENTIFYING DATA				
Dasometry				
Subject	Dasometry			
Code	P03G370V01602			
Study programme	(*)Grao en Enxeñaría Forestal			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Mandatory	3rd	2nd
Teaching language				
Department				
Coordinator	Fernández Alonso, José María			
Lecturers				
E-mail				
Web				
General description	<p>The *asignatura of *Dasometría consists of two big blocks: *Dasometría and Inventory.</p> <p>The first a forest basic science part of the *Dasonomía and very related with the *Selvicultura that centres in the study of the volumes and growths of the forest masses.</p> <p>The second is a group of technicians that allow to the technician in his professional work apply the sciences (*Dasometría) for *recopilar data on the masses and possible future evolution.</p> <p>In the education of the matter, three appearances are fundamental to develop, according to our point of view, in the education of the forest science: intuition, rigour and creation. The intuition situates to the student in the type of problems that wants to attack (through examples), creates a perspective (often through the own history of the problem) and in definite generates an interest. The second level formalises all these intuitions and undresses them of the accessory until *desentrañar the essential. The rigour needs of the abstraction and is fundamental in the transmission of technical knowledges. The creation allows to build own solutions, practical, what before have a forest contact and more learn of this, more motivated goes to continue the study of the *asignatura.</p>			
Competencies				
Code				
B6	Ability to measure, inventory and evaluate forest resources, apply and develop silvicultural techniques and management of all types of forest systems, parks and recreational areas, as well as techniques for harvesting timber and non-timber forest products			
C24	Ability to know, understand and use the principles of: dasometry and forest inventory, forest management.			
D8	Ability to solve problems, critical reasoning and decision making			
Learning outcomes				
Expected results from this subject			Training and Learning Results	

- 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. B6 C24 D8
- 3R. 2018 Be conscious of the multidisciplinary context of the engineering.
- 4R. 2018 Capacity to #analyze products, processes and complex systems in the his field of study; choose and apply analytical methods, of calculation and experimental \*relevantes of form \*relevante and interpret correctly the results of these analyses.
- 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.
- 9R. 2018 Capacity to consult and apply codes of good practices and security of the his speciality.
- 11R. 2018 Understanding of the techniques and methods of analysis, project and applicable investigation and his limitations within the scope of the his speciality.
- 12R. 2018 practical Competition to resolve complex problems, realize complex projects of engineering and realize specific investigations stop his speciality.
- 13R. 2018 Knowledge of the application of materials, teams and tools, technological processes and of engineering and his limitations within the scope of the his speciality.
- 22R. 2018 Capacity to be to the day of the scientific and technological news.

## Contents

### Topic

0. Introduction to the Dasometry	<ul style="list-style-type: none"> <li>1. Why measure?</li> <li>2. Why measure trees and forest masses?</li> <li>3. Dasometry and affine sciences.</li> <li>4. Units of measure.</li> <li>5. Normalisation of symbols used in dasometry.</li> <li>6. Significant figures.</li> <li>7. Precision, bias and accuracy of the data.</li> <li>8. Errors.</li> <li>9. Weight or volume?</li> <li>10. Components of the tree.</li> <li>11. The form of the tree.</li> <li>12. Measurement by trip of fluid.</li> <li>13. Differences between quantity, value and price.</li> </ul>
1. Measurement of Trees: Diameters	<ul style="list-style-type: none"> <li>1.1. Important terms.</li> <li>1.2. Basic dasometric parameters.</li> <li>1.3. Measurement of diameters of the trees.</li> <li>1.4. Measurement of the thickness of bark, diametral growth and age of the tree.</li> <li>1.5. Marked and designation of trees.</li> <li>1.6. Measurement of distances.</li> </ul>
2. Measurement of Trees: Heights	<ul style="list-style-type: none"> <li>2.1. Measurement of slopes.</li> <li>2.2. Measurement of heights.</li> <li>2.3. Recommendations for the measurement of heights.</li> <li>2.4. Relascopio Of Bitterlich.</li> <li>2.5. Other devices of the inventory.</li> <li>2.6. Price devices dasometrycs.</li> </ul>
3. Cubiculation By trozas.	<ul style="list-style-type: none"> <li>3.1. Cubiculation Of trees.</li> <li>3.2. Types dendrométricos.</li> <li>3.3. Procedures for cubages of trees.</li> <li>3.4. Formulas for cubages by trozas.</li> <li>3.5. Rules madereras.</li> </ul>
4. Cubages Complete trunks.	<ul style="list-style-type: none"> <li>4.1. Graphic method.</li> <li>4.2. Function of profile.</li> <li>4.3. Formula of Pressler or of the point guideline.</li> <li>4.4. Cubages Of trees in foot. Pressler-Bitterlich.</li> <li>4.5. Parameters related with form: coefficients of form and mórphics..</li> <li>4.6. Height reduced.</li> </ul>

5. Cubiculation Of masses.	5.1. Stereometry. 5.2. Function of distribution diametric. 5.3. Half parameters of a mass. 5.4. Cubification Of forest masses. 5.5. Prices or tables of cubiculation. 5.6. Tables of mass. 5.7. Trees Type or modular values.
6. Wooden measurement stacked.	6.1. Quantification of the wood stacked. Definition of stereo. 6.2. Other units of apparent volume. 6.3. Coefficient of stacked. 6.4. Methods to calculate the coefficient of stacked.
7. Epidometry	7.1. Definition of epidometry 7.2. Diametral growth and age of the tree. 7.3. Analysis epidometric of trunks. 7.4. Definitions of growth. 7.5. Relation between growths. 7.6. Methods of obtaining of growths. 7.7. Definitions of growth of a mass.
8. Forest inventory	8.1. Definition of inventory. 8.2. Parts of the inventory. 8.3. Types of inventory. 8.4. Planning of the inventory. 8.5. Design of the inventory. 8.6. Units of sampling. 8.7. Methods of sampling. 8.8. Number, size and form of the plots of sampling. 8.9. Methods of realisation of the inventory. 8.10. Determination of the number of sample for a determinate error. 8.10. Estadillos Of taking of data in field.

## Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	26	52	78
Problem solving	4	10	14
Case studies	6	12	18
Studies excursion	14	24	38
Problem and/or exercise solving	1	0	1
Practices report	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
Lecturing	Exhibition by part of the professor of the contents on the matter supporting some presentations of images, diagrams and videos that the student can see/download in the web indicated by the professor
Problem solving	I complement of the master lessons in which they expose practical exercises that the student has to develop applying the algorithms seen in the subject.
Case studies	Study of real cases with examples of different Inventories realised analysing his memory and methodology. With special attention to the solutions of planning employed and the computer applications.
Studies excursion	They will realise three practical exits for the execution of a forest inventory previously designed in the classroom like practical case. The students will have of the material of necessary inventory for the take down of plots and his processed back in cabinet. It will have to present a memory of the inventory realised.

## Personalized assistance

Methodologies	Description
Problem solving	
Studies excursion	

## Assessment

	Description	Qualification	Training and Learning Results
Lecturing	Assistance and participation in the theoretical classes of the *asignatura (7.5 points). Delivery of exercises realised during the classes or of realisation out of the classroom (10 points) .	17.5	C24
Problem and/or exercise solving	Realisation of an examination in which they will evaluate the theoretical and practical concepts of the *asignatura, by means of questions type test, and of theoretical development, as well as practical exercises.	7.5	C24
Practices report	COMPULSORY assistance to the practical classes of the *asignatura, that realise usually in field. In exceptional cases, in which the assistance continued of the student was not possible, will realise a practical examination in field. COMPULSORY assistance to trip of practices of the *asignatura.	7.5	C24

#### Other comments on the Evaluation

The student has to approve the practical part and the theoretical part separately. The assistance to the practices and to the trip of practices is of compulsory character to approve the \*asignatura.

#### Sources of information

##### Basic Bibliography

##### Complementary Bibliography

DIEGUEZ, U. et al., **Dendrometría**, Mundi Prensa □ Fundación Conde del Valle de Salazar,

MARTÍNEZ CHAMORRO, et al., **Manual para a cubicación, taxación e venda de madeira en pe e biomasa forestal**, Universidade de Vigo,

MADRIGAL, A.; ÁLVAREZ, J.G.; RODRÍGUEZ, R.; ROJO, A., **Tablas de producción para los montes españoles**, Fundación Conde del Valle de Salazar,

DIEGUEZ, U. et al., **Herramientas Selvícolas para la Gestión Forestal Sostenible en Galicia**, Xunta de Galicia,

PRIETO RODRÍGUEZ, A.; LÓPEZ QUERO, M., **Dasometría. Versión española de □Dendrométrie de L'école national du génie rural des aux et des forêts**□, Editorial Paraninfo,

ACEMM, **Manual de prevención de riesgos laborales en el sector forestal**, Fundación para la prevención de riesgos laborales. Gobierno de Cantabria,

#### Recommendations

##### Subjects that continue the syllabus

Forest management/P03G370V01605

Physical planning and land management/P03G370V01701

##### Subjects that are recommended to be taken simultaneously

Projects/P03G370V01503

##### Subjects that it is recommended to have taken before

Mathematics: Statistics/P03G370V01301

Forestry/P03G370V01401

Use of forests/P03G370V01601

IDENTIFYING DATA				
Repopulation				
Subject	Repopulation			
Code	P03G370V01603			
Study programme	(*)Grao en Enxeñaría Forestal			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	3rd	2nd
Teaching language				
Department				
Coordinator	González Prieto, Óscar			
Lecturers	Bartolome Mier, Javier González Prieto, Óscar			
E-mail	oscargprieto@uvigo.es			
Web				
General description	(*)Los objetivos generales de la asignatura son: a) Conocer las bases, objeto y fundamentos de las Repoblaciones Forestales b) Conocer las características, métodos y medios necesarios para llevar a cabo las distintas operaciones relacionadas con las repoblaciones forestales c) Conocer los principios generales de la obtención de semilla forestal y producción de planta forestal en vivero.			

Competencies	
Code	
B1	Ability to understand the biological, chemical, physical, mathematical and representation systems necessary for the development of professional activity, as well as to identify the different biotic and physical elements of the forest environment and renewable natural resources susceptible to protection, conservation and exploitations in the forest area.
B2	Ability to analyze the ecological structure and function of forest systems and resources, including landscapes.
C20	Ability to know, understand and use the principles of forestry machinery and mechanization.
C21	Ability to know, understand and use the principles of: reforestation. Gardening and nurseries. Forest improvement
D5	Capacity for information management, analysis and synthesis
D8	Ability to solve problems, critical reasoning and decision making
D10	Autonomous Learning

Learning outcomes	
Expected results from this subject	Training and Learning Results



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.	B1	C20	D5
3R. 2018 Be conscious of the multidisciplinary context of the engineering.	B2	C21	D8
4R. 2018 Capacity to #analyze products, processes and complex systems in the his field of study; choose and apply analytical methods, of calculation and experimental *relevantes of form *relevante and interpret correctly the results of these analyses.			D10
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.			
9R. 2018 Capacity to consult and apply codes of good practices and security of the his speciality.			
11R. 2018 Understanding of the techniques and methods of analysis, project and applicable investigation and his limitations within the scope of the his speciality.			
12R. 2018 practical Competition to resolve complex problems, realize complex projects of engineering and realize specific investigations stop his speciality.			
13R. 2018 Knowledge of the application of materials, teams and tools, technological processes and of engineering and his limitations within the scope of the 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.			
19R. 2018 Capacity to communicate of effective way information, ideas, problems and solutions in the field of the engineering and with the society in general.			
20R. 2018 Capacity to work effectively in national and international contexts, individually and in team, and cooperate with the engineers and people of other disciplines.			

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## Contents

Topic

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Module I \*Planificación and \*ejecución of  
\*replantaciones forest

Subject 1. Concept and election of species  
Lesson 1.1. Concept of \*replantación forest and comment  
Lesson 1.2. Antecedents and need of the \*replantación forest  
Lesson 1.3. Aims of the \*replantación forest  
Lesson 1.4. Election of species

Fear 2. Methods of \*replantación  
Lesson 2.1. Types of methods  
Lesson 2.2. Selection of the method

Fear 3. Treatment of the pre-existing vegetation  
Lesson 3.1. Justification and objective  
Lesson 3.2. Classification of the procedures of \*desbroce  
Lesson 3.3. Description of the procedures of \*desbroce

Subject 4. Preparation of the am used to  
Lesson 4.1. Justification and objective  
Lesson 4.2. Classification of the procedures of preparation of the am used to  
Lesson 4.3. Description of the procedures of preparation of the am used to  
Lesson 4.4. Hydrological appearances of the \*desbroces and of the preparation of the floor

Fear 5. Introduction of the new species  
Lesson 5.1. Density of introduction  
Lesson 5.2. You seed  
Lesson 5.3. Plantations

Fear 6. Back cares of the \*replantaciones and complementary works  
Lesson 6.1. Back cares of the \*replantaciones  
Lesson 6.2. Complementary works

Subject 7. Environmental impact of the \*replantaciones forest  
Lesson 7.1. Introduction and normative  
Lesson 7.2. Considerations on the environmental impact of the \*R. Forest  
Lesson 7.3. Factors affected  
Lesson 7.4. Evaluation of impacts  
Lesson 7.5. Methodological conclusion

Module II Seeds

Subject 8. Generalities on forest seeds  
Lesson 8.1. \*Recolección  
Lesson 8.2. Extraction and cleaning  
Lesson 8.3. Storage  
Lesson 8.4. Treatments of conservation  
Lesson 8.5. Analysis  
Lesson 8.6. Treatments of germination  
Lesson 8.7. It seeds

Module III Nurseries

Subject 9. Generalities on forest nurseries  
Lesson 9.1. Definition and classes  
Lesson 9.2. It waters  
Lesson 9.3. I am used to  
Lesson 9.4. Location, form and size  
Lesson 9.5. Crop of plant to nude root  
Lesson 9.6. Crop of plant in container  
Lesson 9.7. \*Estaquillado  
Lesson 9.8. Quality of the forest plant  
Lesson 9.9. \*Micorrización

Module IV Security, Hygiene and Prevention of  
labour Risks in the \*replantaciones forest

Element 10 \*PRL in \*Replantaciones Forest  
\*Lección 10.1 Risks related with the spaces of work  
\*Lección 10.2 manual Tools  
\*Lección 10.3 portable Machines  
\*Lección 10.4 forest Machinery  
\*Lección 10.5 Manipulation of phytosanitary products  
and \*fertilizantes

**Planning**

	Class hours	Hours outside the classroom	Total hours
Lecturing	25.5	47.5	73

Problem solving	8	14	22
Studies excursion	8	8	16
Project based learning	1	11.5	12.5
Case studies	10.5	14	24.5
Objective questions exam	0.5	0	0.5
Problem and/or exercise solving	0.5	0	0.5
Laboratory practice	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
Lecturing	<p>The master lesson is the common form of development of the expository function, in which the teacher develops a series of concepts related to the contents of the Subject, and the student adopts a receptive role of this information.</p> <p>The use of audiovisual media (slides, transparencies, videos, video canon, etc.) will be constant in these classes since the retention of information is much greater when combining oral and visual stimuli.</p> <p>The masterful lesson serves to conceptually develop a theme, give global versions, develop a working methodology. etc.</p> <p>Depending on the progress of the course, the content of each didactic unit will be provided in advance and in writing, either as notes or as a bibliography, which enables the student to attend classes with previous reading of the topic. On the other hand, if the student knows that what is taught can be found in a book when studying, his attitude in the classroom will be directed to understand the explanation, having to take only marginal notes of what is expanded.</p> <p>In the case of this subject, the use of audiovisual media such as digital presentations, multimedia, transparencies, rear projection, etc. Should expedite the exposure of topics with a marked descriptive character, or in which drawings and schemes of complicated implementation are needed.</p> <p>The classes of directed discussion, will be made at least one throughout the course and consists of the presentation of a topic, which must meet characteristics of real problem, richness in contradictions or reasons for controversy, should be of interest to the students, who Must know the activity well enough and be sufficiently qualified to express opinions about it.</p> <p>The technique is oriented to overcoming uncritical memorization, fostering participation in the group and verbalization of ideas as a means that favors their assimilation. In addition, an important part of the pupils is a difficulty in expression and writing, which can contribute to overcome through this didactic resource. The role of the teacher as the conductor or moderator of the discussion is fundamental allowing all kinds of opinions on the subject.</p> <p>In addition, and in a complementary way to the lecture, after the presentation of controversial topics or of special interest for the students, it is interesting to organize discussions of reduced scope, questions, etc. Such an activity, which is simpler to perform than the previous one, can be considered more as a resource of elaboration and control within the master's lesson than as a technique of a nature alien to it.</p> <p>Other tools that help to reinforce the contents included in the master lessons are.</p> <ul style="list-style-type: none"> <li>- Case study / situation analysis / directed discussion: Formulation, analysis, resolution and debate of a problem or exercise related to the thematic of the subject.</li> <li>- Solving problems and / or exercises in an autonomous way: Formulation, analysis, resolution and debate of a problem or exercise related to the subject matter of the subject.</li> <li>- Presentations / expositions: Oral presentation by the students of a specific subject or work (usually written presentation).</li> <li>- Multimedia Sessions: Use of videographic / online material on aspects of the subject</li> <li>- Study exits / field practices: Visits-outings to the field for the observation and study of aspects previously studied / analyzed</li> </ul>
Problem solving	<p>Resolution of problems and / or exercises Formulation, analysis, Resolution and debate of a problem or exercise related to the theme of the Subject, by the students.</p> <p>Exercises and problems will be carried out on topics such as: static study of forest masses, dynamic study of the forest masses, etc</p>

Studies excursion	<p>The practice of the techniques, theoretically learned, must be carried out in contact with the professional practice which can only be obtained by actual practice of the techniques (or their direct observation) wherever they are carried (Industry, forest masses, etc.)</p> <p>The practice of techniques, theoretically learned, must be carried out in close contact with professional practice which can only be obtained by practicing techniques (or their direct observation) wherever they are carried out (industry, forest masses, etc.).</p> <p>The maximum number of field practices or practical trips should be carried out, without which theoretical teaching is insufficient to achieve the teaching objectives.</p> <p>The field practices are therefore intended to establish the concepts of the subject, give students the opportunity to get in touch with the professional world and foster relationships between students and teacher student outside the center. The realization of practical trips make sense when they really contribute new knowledge that are impossible to acquire in the School itself.</p>
Project based learning	<ul style="list-style-type: none"> <li>- Organization of specific seminars or conferences</li> <li>- Presentations / exhibitions: Oral presentation by the students of a theme Concrete or work (usually written presentation).</li> <li>- Multimedia Sessions: Use of videographic / online material on aspects of the subject</li> <li>- Days of study of aspects previously studied / analyzed in field trips</li> </ul>
Case studies	Case study / situational analysis - Case study / situation analysis or directed discussion: Formulation, analysis, resolution and debate of a problem or exercise related to the subject matter of the subject ..

### Personalized assistance

Methodologies	Description
Case studies	
Problem solving	
Studies excursion	

### Assessment

	Description	Qualification	Training and Learning Results
Lecturing	(*)	0	
Project based learning	(*)	0	
Case studies	(*)	30	C21
Objective questions exam	(*)	30	C21
Problem and/or exercise solving	(*)	40	C21

### Other comments on the Evaluation

Exam calendar:

First Call: June 1, 2020, 4:00 p.m.

Second Call: June 29, 2020, 4:00 p.m.

Publication of notes by official methods.

### Sources of information

#### Basic Bibliography

#### Complementary Bibliography

### Recommendations

#### Subjects that are recommended to be taken simultaneously

Botany/P03G370V01303

Forest Ecology/P03G370V01402

#### Subjects that it is recommended to have taken before

Biology: Plant Biology/P03G370V01201

<b>IDENTIFYING DATA</b>				
<b>Forestry hydrology</b>				
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	xaalvarez@uvigo.es			
Web	<a href="http://http://www.forestaes.uvigo.es/">http://http://www.forestaes.uvigo.es/</a>			
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		
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
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Subject1 Introduction and generalities	<p>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 .</p>
Subject 2 Precipitation	<p>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</p>
Subject 3 Evaporation	<p>Solar radiation  Profiles of wind in vegetation  Evaporation and evapotranspiration  Empirical methods  Interception and transpiration in forests</p>
Subject 4 Infiltration	<p>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</p>
Subject 5 Runoff	<p>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</p>
Subject 6 Hydrographs	<p>Separation of basic flow  Unitary and synthetic hydrographs  Maximum Discharge of runoff</p>
Subject 7 Surface water and groundwater	<p>Aquifers  hydrogeological variables  Equations of subterranean flow</p>
Subject 8 hydrological Measurements	<p>Discharge  Measurements of speed of flow  Measurements with sensors of pressure  Types of control of relation level and discharge</p>
Subject 9 Driving of avenues of water	<p>Introduction  Traffic of aggregated systems  hydrological Traffic in rivers  Traffic distributed of increasing cinematic Wave</p>
Subject 10 hydrological Statistics	<p>Concepts.  Analysis of frequency.  Work of distribution.  Period of return.  Theory of adjust statistical.  Analysis of frequency for extreme values .</p>
Subject 11 hydrological Restoration forest	<p>Action of the forest on water regulation.  Distribution of the the precipitation in forest masses. Intercept.  Translocation.  Trunk runoff  Hydrological techniques reforestation</p>
Subject 12: Water erosion	<p>Types of erosion.  Parametric models  Models of analytical solution .  Stabilization and rehabilitation techniquesn of areas with risk of erosion</p>
Subject 13: Restoration of banks and rivers	<p>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</p>

**Planning**

	Class hours	Hours outside the classroom	Total hours
Computer practices	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
Computer practices	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**

<b>IDENTIFYING DATA</b>				
<b>Forest management</b>				
Subject	Forest management			
Code	P03G370V01605			
Study programme	(*)Grao en Enxeñaría Forestal			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	3rd	2nd
Teaching language	Spanish Galician			
Department				
Coordinator	Fernández Alonso, José María			
Lecturers	Ortiz Torres, Luis			
E-mail	josemfernandez@uvigo.es			
Web				
General description	(*)(*)Durante el curso de Ordenación de Montes se analizarán los diferentes métodos para la Durante o curso de Ordenación de Montes analizaranse os diferentes métodos para a organización e xestión do aproveitamento dos recursos naturais forestais. A ensinanza basearase no repaso da historia forestal europea e da paralela evolución dos métodos de ordenación. A presentación de problemas permitirá introducir as distintas solucións e a aprendizaxe das mesmas por parte do alumno.			

<b>Competencies</b>	
Code	
B6	Ability to measure, inventory and evaluate forest resources, apply and develop silvicultural techniques and management of all types of forest systems, parks and recreational areas, as well as techniques for harvesting timber and non-timber forest products
B10	Ability to apply the techniques of forest management and land planning, as well as the criteria and indicators of sustainable forest management within the framework of forest certification procedures.
B13	Ability to design, direct, elaborate, implement and interpret projects and plans, as well as to write technical reports, recognition reports, assessments, appraisals and appraisals.
C24	Ability to know, understand and use the principles of: dasometry and forest inventory, forest management.
C25	Ability to know, understand and use the principles of: forest legislation and certification; sociology and forestry policy.
D4	Sustainability and environmental commitment
D6	Organization and planning capacity
D8	Ability to solve problems, critical reasoning and decision making

<b>Learning outcomes</b>	
Expected results from this subject	Training and Learning Results



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.	B6 B10 B13	C24 C25	D4 D6 D8
3R. 2018 Be conscious of the multidisciplinary context of the engineering.			
4R. 2018 Capacity to #analyze products, processes and complex systems in the his field of study; choose and apply analytical methods, of calculation and experimental *relevantes of form *relevante and interpret correctly the results of these analyses.			
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.			
9R. 2018 Capacity to consult and apply codes of good practices and security of the his speciality.			
11R. 2018 Understanding of the techniques and methods of analysis, project and applicable investigation and his limitations within the scope of the his speciality.			
12R. 2018 practical Competition to resolve complex problems, realize complex projects of engineering and realize specific investigations stop his speciality.			
13R. 2018 Knowledge of the application of materials, teams and tools, technological processes and of engineering and his limitations within the scope of the 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.			
20R. 2018 Capacity to work effectively in national and international contexts, individually and in team, and cooperate with the engineers and people of other disciplines.			

## Contents

### Topic

Objectives of Forest Management	Definitions and concept Spanish Forest History Conditioning and Tools Objectives of Forest Management Types of Forest Production
Structure and content of Mountain Management Projects	The classic project Structure and content of the Projects
(*)Contido dos instrumentos de ordenación	(*)Estrutura clásica dun P.O Tipoloxía de instrumentos Contidos mínimos
Forestry and Economic Foundations of Forest Management	Silvicultural bases of management Investment analysis Criteria for the determination of the shift and age of maturity
Application Regulations for Ordinance Projects	Application regulations
Impacts of Forestry Activity in the Management Project	Main Impacts Visual impact assessment
(*)Certificación da xestión forestal	(*)Proceso, esquemas e modalidades

## Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	26	52	78
Problem solving	4	10	14
Case studies	6	12	18
Scientific events	4	6	10

Studies excursion	10	18	28
Problem and/or exercise solving	1	0	1
Practices report	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
Lecturing	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.
Problem solving	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.
Case studies	Analysis of an event, issue or actual event in order to know, interpret, solve, generate hypotheses, comparing data, reflect, complete knowledge, diagnose and training in alternative dispute resolution procedures.
Scientific events	Conferences, lectures, exhibitions, panel discussions, debates ... performed by renowned speakers, which you can drill or supplement the contents of the field.
Studies excursion	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.

Personalized assistance	
Methodologies	Description
Problem solving	
Studies excursion	

Assessment			
	Description	Qualification	Training and Learning Results
Problem and/or exercise solving	(*)Avaliación mediante proba de conceptos teóricos	70	B6
Practices report	(*)Avaliación continua do traballo individual	30	B6

### Other comments on the Evaluation

### Sources of information

#### Basic Bibliography

MADRIGAL, A, **Ordenación de Montes Arbolados**, ICONA,

#### Complementary Bibliography

GONZALEZ MOLINA, et al., **Manual de Ordenación por Rodales**, Centre Tecnologic Forestal de Catalunya,

DAVIS, L. S.; JOHNSON, K. N.; BETTINGER, P. S.; HOWARD, T. E, **Forest Management (4th ed.)**, McGraw Hill Publishing Co.,

MADRIGAL, A.; ÁLVAREZ, J.G.; RODRÍGUEZ, R.; ROJO, A., **Tablas de producción para los montes españoles**, Fundación Conde del Valle de Salazar,

DÍAZ-MAROTO, I., **Evolución de los métodos de ordenación de montes en España. Situación actual.**, Escuela Politécnica Superior, Lugo,

ACEMM, **Manual de prevención de riesgos laborales en el sector forestal**, Fundación para la prevención de riesgos laborales. Gobierno de Cantabria,

DIEGUEZ, U. et al., **Herramientas Selvícolas para la Gestión Forestal Sostenible en Galicia**, Xunta de Galicia,

MARTÍNEZ CHAMORRO, et al., **Manual para a cubicación, taxación e venda de madeira en pe e biomasa forestal**, Universidade de Vigo,

**Manual de ordenación de montes de Andalucía**, Junta de Andalucía,

### Recommendations

#### Subjects that continue the syllabus

Physical planning and land management/P03G370V01701

#### Subjects that are recommended to be taken simultaneously

Projects/P03G370V01503

#### Subjects that it is recommended to have taken before

Mathematics: Statistics/P03G370V01301



<b>IDENTIFYING DATA</b>				
<b>Wood technology</b>				
Subject	Wood technology			
Code	P03G370V01606			
Study programme	(*)Grao en Enxeñaría Forestal			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	3rd	2nd
Teaching language	Spanish Galician			
Department				
Coordinator	González Prieto, Óscar			
Lecturers	González Prieto, Óscar			
E-mail	oscargprieto@uvigo.es			
Web	<a href="http://www.forestaes.uvigo.es">http://www.forestaes.uvigo.es</a>			
General description	*Asignatura In which it studies the wood like industrial prime matter, his characteristics and properties			

<b>Competencies</b>	
Code	
B11	Ability to characterize the anatomical and technological properties of wood and non-timber forest raw materials, as well as the technologies and industries of these raw materials.
C28	Ability to know, understand and use the principles of: internal anatomical structure and macroscopic properties of wood.
D4	Sustainability and environmental commitment

<b>Learning outcomes</b>			
Expected results from this subject	Training and Learning Results		
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.	B11	C28	D4
3R. 2018 Be conscious of the multidisciplinary context of the engineering.			
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.			
9R. 2018 Capacity to consult and apply codes of good practices and security of the his speciality.			
13R. 2018 Knowledge of the application of materials, teams and tools, technological processes and of engineering and his limitations within the scope of the his speciality.			
14R. 2018 Capacity to apply norms of engineering in the his speciality.			
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			

<b>Contents</b>	
Topic	
Macroscopic structure of the wood	Albura, heartwood, marrow longitudinal and radial Fabrics Growth in rings Anisotropy of the wood Texture, grain and design
Microscopic structure of the wood	Microscopic structure of the wood of coniferous microscopic Structure of the wood of leafy
Structure submicroscopic	Submicroscopic structure Chemical composition of the wood

Anomalies and defects of the wood	Knots juvenile Wood Anomalies of the growth of the layer cambial Fends Wood of reaction internal Tensions of growth Stock exchanges of resin Other defects of the wood
Properties of the wood	Physical properties of the wood mechanical Properties of the wood
Industrial classification of the wood in roll	Classification in function of the characteristics of the wood and his aptitude for the different industrial applications

### Planning

	Class hours	Hours outside the classroom	Total hours
Lecturing	29	72	101
Laboratory practical	10	20	30
Studies excursion	4	8	12
Introductory activities	1	0	1
Problem and/or exercise solving	2	0	2
Practices report	0	4	4

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

### Methodologies

	Description
Lecturing	Exhibition of aims and contents and importance of the same inside the group of competitions of the subject.
Laboratory practical	Realisation and individual presentation and in groups of works of laboratory
Studies excursion	Explanation in situ of industrial and technical processes of laboratory
Introductory activities	Initial explanation of the aims and development of the subject.

### Personalized assistance

Methodologies	Description
Laboratory practical	

### Assessment

	Description	Qualification	Training and Learning Results
Lecturing	Continuous evaluation through the assistance to the classes of classroom	20	
Laboratory practical	Continuous evaluation through the assistance to the practices of laboratory	5	
Problem and/or exercise solving	Realisation of partial proofs and finals	70	
Practices report	Realisation and presentation of the memories of the practices of laboratory	5	

### Other comments on the Evaluation

Exam calendar:

First Call: June 3, 2020, 4:00 p.m.

Second Call: June 6, 2020, 12:00 a.m.

Publication of notes by official methods.

### Sources of information

#### Basic Bibliography

#### Complementary Bibliography

Santiago Vignote Peña, **TECNOLOGIA DE LA MADERA (3ª ED.)**, Muni Prensa,

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**Recommendations**

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**Subjects that continue the syllabus**

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Primary wood processing industries/P03G370V01706

Wood preservation and drying technology/P03G370V01705

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**Subjects that it is recommended to have taken before**

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Physics: Physics I/P03G370V01102

Physics: Physics II/P03G370V01202

Botany/P03G370V01303

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IDENTIFYING DATA				
<b>Xylo energy</b>				
Subject	Xylo energy			
Code	P03G370V01607			
Study programme	(*)Grao en Enxeñaría Forestal			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	3rd	2nd
Teaching language	Spanish Galician			
Department				
Coordinator	Ortiz Torres, Luis			
Lecturers	Ortiz Torres, Luis			
E-mail	lortiz@uvigo.es			
Web	<a href="http://www.webs.uvigo.es/lortiz">http://www.webs.uvigo.es/lortiz</a>			
General description	(*)procesos de transformación física y conversión energética de biomasa			

Competencies	
Code	
B1	Ability to understand the biological, chemical, physical, mathematical and representation systems necessary for the development of professional activity, as well as to identify the different biotic and physical elements of the forest environment and renewable natural resources susceptible to protection, conservation and exploitations in the forest area.
B6	Ability to measure, inventory and evaluate forest resources, apply and develop silvicultural techniques and management of all types of forest systems, parks and recreational areas, as well as techniques for harvesting timber and non-timber forest products
B11	Ability to characterize the anatomical and technological properties of wood and non-timber forest raw materials, as well as the technologies and industries of these raw materials.
C26	Ability to know, understand and use the principles of: xiloenergetic industrial processes
D2	Ability to communicate orally and written in Spanish or in English
D9	Teamwork skills, skills in interpersonal relationships and leadership.
D10	Autonomous Learning

Learning outcomes	
Expected results from this subject	Training and Learning Results

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.	B1 B6 B11	C26	D2 D9 D10
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.			
9R. 2018 Capacity to consult and apply codes of good practices and security of the his speciality.			
11R. 2018 Understanding of the techniques and methods of analysis, project and applicable investigation and his limitations within the scope of the his speciality.			
12R. 2018 practical Competition to resolve complex problems, realize complex projects of engineering and realize specific investigations stop his speciality.			
13R. 2018 Knowledge of the application of materials, teams and tools, technological processes and of engineering and his limitations within the scope of the 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.			
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			
19R. 2018 Capacity to communicate of effective way information, ideas, problems and solutions in the field of the engineering and with the society in general.			
21R. 2018 Capacity to recognize the need of a continuous training and realize this activity of independent way during his professional life.			
22R. 2018 Capacity to be to the day of the scientific and technological news.			

## Contents

### Topic

Topic 1.- INTRODUCTION: BIOMASS AS A SOURCE OF ENERGY	1.1.- Concept and forms of BIOMASS 1.2.- Historical evolution of the energy utilization of Biomass .. 1.3.- Sources of Biomass 1.4.- Characteristics of the biomass from the energetic point of view 1.5.- Advantages presented by the energy use of the Phytomass 1.6.- Technologies for energy conversion of biomass 1.6.1.- Chemical methods of conversion 1.6.2.- Thermochemical conversion methods 1.6.3.- Biochemical conversion methods 1.6.4.- Efficiency of the different methods of energy conversion. 1.7.- Products derived from biomass 1.7.1.- Macroeconomic aspects of the production and use of biofuels
2.- XILOGENERATED ENERGIES	2.- XILOGENERATED ENERGIES
3. COLLECTION AND OBTAINMENT OF RESIDUAL BIOMASS	3.1 systems for collecting residual forest biomass 3.1.1 Forest machines
4. PRETRATING PROCESSES (PHYSICAL TRANSFORMATION) OF RESIDUAL PHYTOMASE	4.1 Chipping and packaging 4.1.1 Problems of large chipping 4.2 Natural Drying 4.3 Forced drying grind 4.4 4.4.- Sieving 4.5.- densification
Topic 5. DEHYDRATION OF RESIDUAL PHYTOMASE	5.1 Water in wood 5.1.1 Humidity Equilibrium 5.1.2 Influence of moisture content on calorific 5.2 thermogenesis 5.2.1 dynamic drying full of wood waste chips 5.2.2 Dry matter losses 5.3 Practical experiences of natural drying 5.3.1 Forced ventilation 5.3.2 Experiences in Spain



Topic 6. COMPACTION OF RESIDUAL PHYTOMASE	6.1 Historical evolution 6.2 Background to research and development 6.2.1 laboratory experimentation 6.2.2 Experimentation in industrial presses 6.2.3 Studies of theoretical models 6.3 Prospects for the future 6.4 Problems and densification technologies on an industrial scale 6.4.1 manufacture of briquettes 6.4.2 pelletizing
Topic 7. CURRENT SITUATION OF THE FUEL PRODUCTION SECTOR IN SPAIN	7.1 The raw materials used 7.2 The equipment used 7.2.1 Sizing companies 7.3 Products obtained 7.3.1 Packaging 7.4.- Consumer sectors 7.4.1.- prices
Topic 8. CURRENT SITUATION OF THE COMBUSTIBLE PELLET MANUFACTURING SECTOR IN SPAIN	8.1 Characteristics of fuel pellets 8.2 prices
Topic 9.- THERMOCHEMICAL PROCESSES OF ENERGY CONVERSION OF PHYTOMASE.	9.1.- Combustion 9.2.- Gasification 9.3.- Pyrolysis 9.4.- Liquefaction
Topic 10. THE COMBUSTION	10.1 The Theory of Combustion 10.1.1.- types of combustion 10.1.2.- minimum combustion air 10.1.3.- Combustion fumes 10.2.- Combustion equipment 10.2.1.- Fluidized combustion (FBC)
Topic 11.GASIFICATION	11.1.- Types of gasifiers 11.2.- Gasification with air 11.3.- Gasification with oxygen and / or steam 11.4.- Gasification with Hydrogen 11.5.- Gasification with catalysts
Topic 12. PIROLISIS	12.1.- Products obtained 12.2.- Carbonization (charcoal)
Topic 13.- ELECTRICAL ENERGY GENERATION EQUIPMENT AND SYSTEMS	
Topic 14.- ENERGY CROPS OF SHORT ROTATION	14.1.- Prospects of intensive cultivation of biomass in the European Union before the new Community Agricultural Policy (CAP) 14.2.- Types of energy crops 14.2.1.- Agroelectrical crops 14.2.2.- Bioalcohol 14.2.3.- Bio-fuels
PRACTICE Nº 1	SAMPLES OF WASTE LABORATORY ANALYSIS PLACE: E. XILOGENERADAS LABORATORY
PRACTICE Nº2	PILOT PLANT FOR SLIPPING-MILLING-DENSIFICATION PLACE: E. XILOGENERADAS WORKSHOP
PRACTICE Nº 3	ASTILLADO DESCORTEZADO COMBUSTION COGENERATION  PLACE: ENCE (PONTEVEDRA) DEPARTURE FROM THE EIF - 10h
PRACTICE Nº 4	MOLIENDA DRYING PELETIZED COGENERATION  PLACE: PÉLET FACTORY (BASTAVALES) EIF OUTPUT - 10 h
PRACTICE Nº 5	Visit to an installation with forest biomass boiler.
PRACTICES Nº 6-7	Location: Campus de Pontevedra Resolution of energy calculation exercises

<b>Planning</b>			
	Class hours	Hours outside the classroom	Total hours
External practices	18	36	54
Laboratory practical	5	10	15
Lecturing	26	52	78
Essay questions exam	1	0	1

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

<b>Methodologies</b>	
	Description
External practices	These are visits to industrial installations
Laboratory practical	These are lab work and pilot plant of xylenogenic energies
Lecturing	These are classroom classes

<b>Personalized assistance</b>	
Methodologies	Description
Lecturing	It refers to the theory classes held in the classroom
External practices	These are visits to industrial facilities
Laboratory practical	Laboratory work and pilot plant of xylogen energies

<b>Assessment</b>			
	Description	Qualification	Training and Learning Results
External practices	(*)Valorarase a asistencia ás clases presenciais e visitas/prácticas de campo	20	C26
Laboratory practical	(*)Valoraranse os traballos/exercicios realizados durante as mesmas.	20	C26
Essay questions exam	(*)Avaliarase mediante un exame final	60	C26

### **Other comments on the Evaluation**

the student must approve a practical part and a theoretical part separately. Exam dates 28 DE MAIO 10h 10 DE XULIO 12h

<b>Sources of information</b>	
<b>Basic Bibliography</b>	
<b>Complementary Bibliography</b>	

### **Recommendations**

IDENTIFYING DATA				
<b>(*)Enxeñaría ambiental</b>				
Subject	(*)Enxeñaría ambiental			
Code	P03G370V01609			
Study programme	(*)Grao en Enxeñaría Forestal			
Descriptors	ECTS Credits	Choose	Year	Quadmester
	6	Optional	3rd	2nd
Teaching language	Spanish Galician			
Department				
Coordinator	Ortiz Torres, Luis			
Lecturers	Ortiz Torres, Luis			
E-mail	lortiz@uvigo.es			
Web	<a href="http://www.webs.uvigo.es/lortiz">http://www.webs.uvigo.es/lortiz</a>			
General description	(*)metodos e sistemas de xestión medioambiental			

Competencies
Code

Learning outcomes	
Expected results from this subject	Training and Learning Results

Contents	
Topic	
A. ATMOSPHERIC POLLUTION	A.1. ENVIRONMENTAL POLLUTANTS A.2. EFFECTS OF ATMOSPHERIC POLLUTION A.3. DESTRUCTION OF THE OZONE LAYER A.4. GLOBAL QUALITY A.4.1. Greenhouse gases A.4.2. The Kyoto Protocol TO 5. ACID RAIN A.6. OTHER CONTAMINANTS A.7. RIGHTS CORRUPTION OF POLLUTION A.8. ALTERNATIVE SOURCES OF ENERGY TO REDUCE ATMOSPHERIC EMISSIONS A.9. THE COGENERATION OF HEAT AND ELECTRICITY
B. RESIDUAL WATERS B.1. WATER	B.2. MANAGEMENT SYSTEMS: B.3. PHYSICO-CHEMICAL WATER PARAMETERS B.4. RESIDUAL WATER CONTAMINANTS B.5. RESIDUAL WATER PURIFICATION SYSTEMS B.5.2. Primary treatment B.5.2.1. Physical and Chemical Treatments B.5.3. Secondary treatment B.5.3.1. Biological Treatments B.5.4. Tertiary treatment B.5.5. Miscellaneous Treatments B.6. THE ANAEROBIA DIGESTION PROCESS B.7. FLOOR TREATMENT B.8. CASE STUDY
C. URBAN SOLID WASTE	C.1. LOS R.S.U. C.2. TREATMENT SYSTEMS C.2.2. CONTROLLED SHIFT C.2.2.1. Landfill with controlled use C.2.3. COMPOUND C.2.4. INCINERATION C.2.5. PYROLYSIS C.2.6. COMPARISON BETWEEN MANAGEMENT SYSTEMS

D. COMPOSITION	D.1. THE COMPOUND PROCESS D.1.1. PHYSICAL PARAMETERS D.1.2. COMPOUND SYSTEMS D.1.2.1. Indoor composting systems D.1.3. DEPURATION OF COMPOST D.1.4. COMPOST CHARACTERISTICS D.1.5. USING THE COPOST D.2. CROPS OF INTENSIVE TYPE
E. THE ANAEROBIA DIGESTION	E.1. THE ANAEROBIA DIGESTION E.2. PARAMETERS OF OPERATION AND CONTROL OF THE ANAEROBIC PROCESSES E.3. ANAEROBIA DIGESTION TECHNOLOGY E.3.1. Discontinuous digesters E.3.2. Continuous digesters E.3.2.1. Digesters with suspended biomass E.3.3. Two Phase Digester E.4. CONTROLLED VERTEDERO E.5. ANAEROBIA DIGESTION FACILITIES E.5.1. DESCRIPTION OF AN ANAEROBIA DIGESTION PLANT E.6. EXAMPLE OF INDUSTRIAL FACILITIES
F. THE RECYCLING	F.1. INTRODUCTION F.2. RECYCLED THEORY F.3. RECYCLING SYSTEMS F.4. PROBLEM OF THE RECYCLING PROCESS F.5. ADVANTAGES CONCERNING RECYCLING F.6. RECYCLING OF PAPER AND CARDBOARD F.6.1. PRODUCTION OF PASTE AND PAPER F.6.2. RECYCLING PAPER F.6.2.1. PREPARATION OF PAPER PASTE FROM PAPELOTE F.6.2.2.- DISFRANCO F.6.2.3.-DEPURATION F.6.3.4. UNLOCKED F.6.3.5. REFINO F.6.3.6. DIVISION F.6.3.7. IT'S HEAVY F.6.3.8. DISPERSION F.6.3.9. DESTINED
G. TOXIC AND DANGEROUS WASTE	G.1. IDENTIFICATION AND QUANTIFICATION OF RTP. G.2. PRODUCTION MANAGER RELATIONSHIP G.1.1. Obligations of the RPT Producer G.1.1.1. Authorization request G.2.1.2. Packaging and Labeling of Hazardous Wastes G.2.1.3. Storage of hazardous waste G.2.1.4. Annual statement G.2.2. OBLIGATIONS OF SMALL PRODUCERS OF HAZARDOUS WASTE

## Planning

	Class hours	Hours outside the classroom	Total hours
Studies excursion	20	40	60
Case studies	10	0	10
Autonomous problem solving	9	20	29
Lecturing	17	33	50
Essay questions exam	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
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Studies excursion	<p>Practices Practice 1.- Waste water treatment plant (EDAR - Pontevedra)</p> <p>Practice 2.- MSW treatment plant (SOGAMA - Cerceda)</p> <p>Practice 3.- Cogeneration and treatment of effluents (ENCE)</p> <p>Practice 4.- Cogeneration and waste management (ECOWARM- Bastabales)</p>
	The A91 competition will be developed in the field of industrial facilities visits.
Case studies	Individual or paired an individual chosen within the contents of the program for the elaboration of a situation or concrete case that will be presented publicly.
Autonomous problem solving	This is to present flow diagrams of the facilities visited during the course
Lecturing	These are theoretical classes in the classroom

#### Personalized assistance

Methodologies	Description
Studies excursion	These are views of industrial facilities
Case studies	It is a practical work and present it publicly

#### Assessment

	Description	Qualification Training and Learning Results
Studies excursion	(*)Valórase a asistencia dos alumnos ás saídas prácticas	10
Case studies	(*)O traballo é valorado e avaliado polos propios compañeiros tras a presentación do mesmo e polo profesor quen terá en consideración todos os factores sinalados no apartado de traballos tutelados	20
Lecturing	(*)Valorarase a asistencia ás clases.	10
Essay questions exam	(*)Avaliaranse os coñecementos adquiridos durante o desenvolvemento da materia.	60

#### Other comments on the Evaluation

#### Sources of information

##### Basic Bibliography

Sánchez, Antoni, **De residuo a recurso**, 1, Mundi Prensa, 2014

Gil, Manuel, **Depuración de aguas residuales**, 1, CSIC, 2013

Seoanez, Mariano, **Manual de aguas residuales industriales**, 1, Mac Graw Hill, 2012

Picoraio, Simona, **Gestión de residuos Urbanos**, 1, CEYSA, 2016

Seoanez, Mariano, **Tratado de la contaminación atmosférica**, 1, Mundi Prensa, 2012

##### Complementary Bibliography

#### Recommendations