



IDENTIFYING DATA

Xylo energy

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	http://www.webs.uvigo.es/lortiz			
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
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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 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. Location: Campus de Pontevedra
PRACTICES Nº 6-7	Resolution of energy calculation exercises

Planning			
	Class hours	Hours outside the classroom	Total hours
Practicum, External practices and clinical 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.

Methodologies	
	Description
Practicum, External practices and clinical practices	These are visits to industrial installations
Laboratory practical	These are lab work and pilot plant of xylenogenic energies
Lecturing	These are classroom classes

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

Assessment			
	Description	Qualification	Training and Learning Results
Practicum, External practices and clinical 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

Sources of information

Basic Bibliography

Complementary Bibliography

Recommendations

Other comments
Eligible subject for dual training projects as established by the memory of the degree.

Contingency plan

Description

=== EXCEPTIONAL PLANNING ===
Given the uncertain and unpredictable evolution of the health alert caused by COVID-19, the University of Vigo establishes an extraordinary planning that will be activated when the administrations and the institution itself determine it, considering safety, health and responsibility criteria both in distance and blended learning. These already planned measures guarantee, at the required time, the development of teaching in a more agile and effective way, as it is known in advance (or well in advance) by the students and teachers through the standardized tool.

=== ADAPTATION OF THE METHODOLOGIES ===

* Teaching methodologies maintained

- * Teaching methodologies modified
- * Non-attendance mechanisms for student attention (tutoring)
- * Modifications (if applicable) of the contents
- * Additional bibliography to facilitate self-learning
- * Other modifications

=== ADAPTATION OF THE TESTS ===

- * Tests already carried out
- Test XX: [Previous Weight 00%] [Proposed Weight 00%]

...

- * Pending tests that are maintained
- Test XX: [Previous Weight 00%] [Proposed Weight 00%]

...

- * Tests that are modified
- [Previous test] => [New test]

- * New tests

- * Additional Information
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