Universitat de Lleida

DEGREE CURRICULUM

FOREST BIOREFINERIES

Coordination: CANELA GARAYOA, RAMON

Academic year 2023-24

FOREST BIOREFINERIES 2023-24

Subject's general information

<table>
<tr><td>Subject name</td><td>FOREST BIOREFINERIES</td></tr>
<tr><td>Code</td><td>102486</td></tr>
<tr><td>Semester</td><td>1st Q(SEMESTER) CONTINUED EVALUATION</td></tr>
<tr><td>Typology</td><td>
<table>
<tr><th>Degree</th><th>Course</th><th>Character</th><th>Modality</th></tr>
<tr><td>Bachelor's Degree in Forest Engineering</td><td>4</td><td>OPTIONAL</td><td>Attendance-based</td></tr>
<tr><td>Double degree: Bachelor's degree in Forest Engineering and Bachelor's degree in Nature Conservation</td><td>5</td><td>OPTIONAL</td><td>Attendance-based</td></tr>
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<tr><td>Course number of credits (ECTS)</td><td>6</td></tr>
<tr><td>Type of activity, credits, and groups</td><td>
<table>
<tr><th>Activity type</th><th>PRAULA</th><th>TEORIA</th></tr>
<tr><td>Number of credits</td><td>2</td><td>4</td></tr>
<tr><td>Number of groups</td><td>1</td><td>0</td></tr>
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<tr><td>Coordination</td><td>CANELA GARAYOA, RAMON</td></tr>
<tr><td>Department</td><td>ENVIRONMENT AND SOIL SCIENCES AND CHEMISTRY</td></tr>
<tr><td>Important information on data processing</td><td>Consult this link for more information.</td></tr>
<tr><td>Language</td><td>Català: 100%</td></tr>
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FOREST BIOREFINERIES 2023-24

Teaching staff	E-mail addresses	Credits taught by teacher	Office and hour of attention
CANELA GARAYOA, RAMON	ramon.canela@udl.cat	0	

Subject's extra information

Forest Biorefinery is an optional subject of the Degree in Forest Engineering in the corresponding block of "Environment and landscape". The aim of this course is to give students an overview of the problems caused in nature due to the use of fossil resources in different fields of human activity, and to present possible solutions through sustainable exploitation of plant biomass of forest origin from the point of view of Green Chemistry (Biorefinery).

Learning objectives

Academic objectives of the course:

The student, on passing the subject should be able to:

- Understand what a biorefinery is and the different possibilities it offers for the forestry sector.

- Understand the processes for generating added value in a forestry biorefinery, both from wood and non-wood resources.

- To have basic knowledge of the applications that can be made from the forestry sector in the field of biofuels, bio-based products and biomaterials by applying both chemical and biotechnological technologies.

Competences

General competences

CB2. That students know how to apply their knowledge to their work or vocation in a professional manner and possess the competences that are usually demonstrated through the elaboration and defence of arguments and the resolution of problems within their area of study.
CB3. Students have the ability to gather and interpret relevant data (usually within their field of study) in order to make judgements that include reflection on relevant social, scientific or ethical issues.
CB4. Students are able to communicate information, ideas, problems and solutions to both specialist and non-specialist audiences.
CB5. That students have developed the necessary learning skills to undertake further studies with a high degree of autonomy.

In addition, the graduate must be able to:

CG1. Ability to understand the chemical fundamentals necessary for the development of professional activity, as well as to identify renewable natural resources susceptible to exploitation in the forestry field.
GC11. Ability to characterise the technological properties of timber and non-timber forest raw materials, as well as the technologies and industries of these raw materials.
GC14. Ability to understand, interpret and adopt scientific advances in the forestry field, to develop and transfer technology and to work in a multilingual and multidisciplinary environment.
GC15. Correctness in oral and written expression
GC17. Proficiency in information and communication technologies.
GC18. Respect for the fundamental rights of equality between men and women, the promotion of Human Rights and the values of a culture of peace and democratic values.

Specific Competences

- Basic training module
CEFB4. Basic knowledge of general chemistry, organic and inorganic chemistry and their applications in engineering.

- Module common to the forestry branch
Ability to know, understand and use the principles of:
CEMC13. Forestry exploitation.

- Other competences:
Basic knowledge of the chemical basis of the main environmental problems caused by the use of fossil resources.
Basic knowledge of sustainable chemistry oriented to the use of forest resources.

Subject contents

Agenda

Forest biorefineries: conceptual definition. Challenges and opportunities.
Forest biorefineries in the framework of the Bioeconomy: concept and evolution.
Policies and strategies linked to the bioeconomy.
End-product based biorefineries.
Biorefineries based on raw material.
Integrated biorefineries: current examples.
Biorefineries and biotechnology: realities and possibilities.

Practical seminars
Reading, presentation and discussion of selected scientific articles and publications.

Visits

3 visits to different facilities with three different approaches.

Laboratory practicals

1.- Identification of genes related to the use of forestry resources.

2.- Manufacture of cellulose yarn from cellulose base

Methodology

Tipus d'activitat	Descripción	Activitat presencial Alumne		Activitat no presencial Alumne		Avaluació	Temps total	
		Objectius	Hores	Treball alumne	Hores	Hores	Hores	ECTS
Lliçó magistral	Classe magistral (Aula. Grup gran)	Explicació dels principals conceptes	24	Estudi: Conèixer, comprendre i sintetitzar coneixements	**50**		**74**	**2,96**
Problemes i casos	Classe participativa (Aula. Grup gran)	Resolució de problemes i casos		Aprendre a resoldre problemes y casos				
Seminari	Classe participativa (Grupo mitja)	Realització de activitats de discussió o aplicació	8	Resoldre problemes i casos. Discutir	**12**	**3**	**23**	**0.92**
Laboratori	Pràctica de Laboratori (Grupo mitja)	Execució de la pràctica: comprendre fenòmens, mesurar...	18	Estudiar i Realitzar memòria	**10**		**28**	**1,12**

Aula d'informàtica	Pràctica de aula d'informàtica (Grupo mitja)	Execució de la pràctica: comprendre fenòmens, mesurar...		Estudiar i Realitzar memòria				
Pràctiques de camp	Pràctica de campo (Grupo mitja)	Execució de la pràctica: comprendre fenòmens, mesurar...		Estudiar i Realitzar memòria				
Visites	Visita a explotacions o industries	Realització de la visita		Estudiar y Realitzar memòria				
Activitats dirigides	Treball de l'alumne (individual o grup)	Orientar a l'alumne en el treball (en horari de tutories)	10	Realitzar un treball bibliogràfic, pràctic, etc.	**12**	3	**25**	**1**
Altres								
Totals			**60**		**84**	**6**	**150**	**6**

Evaluation

Activities

Activity	Description	Number	%
Theory	Written tests (true/false) on the theory of the subject	2	**50**
Case analysis			
Laboratory	Delivery of memory	1	**15**
Seminar			
Informatics			
Field practices			
Visit	Delivery of memory	3	**15**
Written activity	critical review of an article. Delivery of memory	2	**20**
Other			
Total			**100**

Bibliography

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