

Name	Circular Bioeconomy		Field of study	-	
Classification	Extracurricular Course/Project		School	Polytechnic Institute of Bragança	
Academic Year	2021/2022	Year of study	-	Level	-
Type	Semestral	Semester	2	ECTS credits	6.0
Code	9999-940-1031-00-21				
Workload (hours)	162	Contact hours	T -	TP -	PL -
			TC -	S -	E -
			OT -	O -	

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) Artur Jorge de Jesus Gonçalves, Elsa Cristina Dantas Ramalhosa, Maria Filomena Filipe Barreiro, Ursula Andrea Gonzales Barron, Vasco Augusto Pilão Cadavez

### Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

1. Identify and apply the principles of circular bioeconomy.
2. Recognize the importance of circular bioeconomy at economic, environmental, and social levels.
3. Assess, discuss and present circular bioeconomy strategies.

### Prerequisites

Before the course unit the learner is expected to be able to:  
Not applicable

### Course contents

Circular Economics; Degrowth economics; Bioeconomy; Biotechnology in Bioeconomy; Quality, innovation and data analytics in food businesses; Bioenergy; Life Cycle Analysis.

### Course contents (extended version)

1. Circular Economics
  - What does the circular economy (including the biobased economy) entail?
  - Why is circular economy necessary and why do companies/organizations go green?
  - How can companies/organizations embark on the journey towards a circular economy?
2. Degrowth economics
  - What is the context of degrowth economics?
  - What trends and developments do we see?
  - What business models need to be developed?
  - What could the role of the biobased economy be?
3. Bioeconomy
  - Introduction to bio-based economy.
  - Photosynthesis as the basis of primary biomass production on earth.
  - Types of biomass and their availability and processing.
  - Biomass for human nutrition, feed, bioenergy, biofuels, bioplastics, biorefineries.
4. Biotechnology in bioeconomy
  - Microorganisms and enzymes are the main biocatalysts used in biotechnological production systems.
  - Biotechnological processes are performed in different types of bioreactors.
  - Various biotechnological production processes relevant for bioeconomy are presented.
5. Quality, innovation and data analytics in food businesses
  - Innovation in food processes and products.
  - Quality and safety of food products.
  - Data analytics.
6. Bioenergy
  - Biomass as a source for renewable energy
  - Processes for bioenergy generation
  - Thermal use, biogas and biomethane, biofuels (e.g. BtL, bioethanol, and biodiesel)
7. Life Cycle Analysis (LCA)
  - Life cycle approach
  - LCA process and methodologies
  - Life cycle assessment (ISO 14040 and 14044)

### Recommended reading

Não existe bibliografia específica. Os alunos são incentivados a selecionar a bibliografia de acordo com o tema do projeto, nomeadamente, a recorrerem a bibliotecas científicas/técnicas digitais.

### Teaching and learning methods

The UC comprises the exposition of theoretical concepts organized in 6 online sessions, followed by a short-term physical mobility period at IPB and a project development. During the physical mobility, the students are requested to solve a real case study posed by a company. Both project and the real case will be developed in interdisciplinary groups and in a co-creation environment.

### Assessment methods

- Project - 100% - (Regular, Student Worker) (Final, Supplementary, Special)

### Language of instruction

English

## Electronic validation

Artur Jorge de Jesus Gonçalves, Elsa Cristina Dantas Ramalhosa, Maria Filomena Filipe Barreiro, Ursula Andrea Gonzales Barron, Vasco Augusto Pilão Cadavez	Vera Alexandra Ferro Lebres
15-03-2022	15-03-2022