

## Green Biotechnology and Intelligent Mariculture (C004325)

Due to Covid 19, the education and assessment methods may vary from the information displayed in the schedules and course details. Any changes will be communicated on Ufora.

<b>Course size</b>	<i>(nominal values; actual values may depend on programme)</i>		
<b>Credits 3.0</b>	<b>Study time 75 h</b>	<b>Contact hrs</b>	32.0h

### Course offerings in academic year 2021-2022

A (semester 1)	English	Gent
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### Lecturers in academic year 2021-2022

Hellio, Claire	BREST02	lecturer-in-charge
ar Gall, Erwan	BREST02	co-lecturer
Boudry, Pierre	BREST02	co-lecturer
Connan, Solène	BREST02	co-lecturer
Stiger-Pouvreau, Valérie	BREST02	co-lecturer

### Offered in the following programmes in 2021-2022

<a href="#">International Master of Science in Marine Biological Resources</a>	<b>crdts</b>	<b>offering</b>
	3	A

### Teaching languages

English

### Keywords

### Position of the course

The impact that biotechnology can have on our society and economy will be reviewed in this unit. An overview of industrial biotechnology and its applications in a number of product categories ranging from food ingredients, vitamins, bio-colorants, solvents, plastics and biofuels will be exposed. This module will also focus on the understanding of the environmental and safety risks associated with biotechnology together with methods for limiting damage and risk. New biotechnologies will affect the natural environment primarily in two ways: by bringing relatively "wild" areas, such as estuaries, under domestication, and by forcing areas now domesticated, such as farms, out of production, because of surpluses. The problem of the safety of biotechnology—the risk of some inadvertent side-effect—seems almost trivial in relation to the social and economic implications of these intentional uses. Aquaculture productivity is predicted to increase but will need to be re-designed to avoid pollution. The module will focus on the practice of integrating aquaculture and agriculture, also referred to as Integrated Agri-Aquaculture Systems (IAAS), which is based on the need to achieve more economically viable and environmentally sustainable primary industries, and specifically to enhance farm productivity and water use efficiency through multiple water use for integrated production of both terrestrial and aquatic crops. The importance of life cycle analysis (LCA) in biotechnology will be highlighted.

### Contents

The unit will focus on the expected changes in society and technology, ranging from the shift in the supply of resources, the growing need for efficiency and sustainability of the production systems, changing consumer perception and behaviour and changing mariculture systems and practices. Many of these changes are expected to speed up the transition from a fossil-based to a bio-based economy and society. The module provides an understanding of the use of raw materials such as water, energy and land/coastal waters in industry and transport. It lays the foundation for further in-depth studies of ways in which biotechnology

can support recycling, reuse of existing materials and in the generation of new supplies of raw materials.

During lectures and workshops, the following topics will be covered :

**Chapter 1:** industrial sustainability

**Chapter 2:** risk (perception and assessment) and safety in biotechnology

**Chapter 3:** environmental impact of biotechnology

**Chapter 4 :** integrated agri-aquaculture systems (IAAS).

### **Initial competences**

### **Final competences**

- 1 In lectures, to provide a framework for understanding contemporary constraints and opportunities for modern use of marine biomass for food and non-food products within a framework of integrated culture.
- 2 In paper analysis and small group work, develop skills in critical analysis and provide confidence in working with complex concepts in biology and society.
- 3 In oral presentations, promote skills in succinct oral communication of science.
- 4 In essays, promote scientific writing skills and to encourage the use of library, archival, electronic and other reference sources.

### **Conditions for credit contract**

Access to this course unit via a credit contract is determined after successful competences assessment

### **Conditions for exam contract**

This course unit cannot be taken via an exam contract

### **Teaching methods**

Seminar, Lecture

### **Extra information on the teaching methods**

Formal lectures introduce the syllabus, with lecture-specific reading lists of primary literature sources guiding follow up study. Workshops encourage the development of teamwork, while supporting the development of understanding of the syllabus. Review essays are used to develop critical assessment of the primary literature.

### **Learning materials and price**

### **References**

- G. Acquaaah. Understanding Biotechnology: An Integrated and Cyber-Based Approach 1st Edition. Publisher: Pearson Prentice Hall. ISBN-13: 978-0130945006 .
- A. Scragg. Environmental biotechnology. 2nd edition. Publisher: Oxford University Press. ISBN-13: 9780199268672

### **Course content-related study coaching**

### **Assessment moments**

end-of-term and continuous assessment

### **Examination methods in case of periodic assessment during the first examination period**

Written examination

### **Examination methods in case of periodic assessment during the second examination period**

Written examination

### **Examination methods in case of permanent assessment**

Oral examination, Assignment

### **Possibilities of retake in case of permanent assessment**

examination during the second examination period is possible

### **Calculation of the examination mark**

- A 2 hours examination (unseen) (50%) in which two questions are to be answered.
- One review essay (30%) (3000 words).
- Students (working by pair) will deliver a 20 min oral presentation presenting a LCA analysis (20%).

