# SYLLABUS

## 1. DESCRIPCIÓN DE LA ASIGNATURA

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|---|---|
| **Degree:** | **Biotechnology** |
| **Course:** | **Cultivation of Photosynthetic Microorganisms and their Biotechnological Applications** |
| **Module:** | **Optional Training** |
| **Department:** | **Physiology, Anatomy and Cell Biology** |
| **Academic Year:** | **2017-2018** |
| **Term:** | **Second** |
| **ECTS credits:** | **6** |
| **Year:** | **4th year** |
| **Type:** | **Optional** |
| **Language:** | **Spanish** |

| **Course Model:** | |
|---|---|
| **a. Basic Learning (EB):** | **60%** |
| **b. Practical Learning (EPD):** | **25%** |
| **c. Guided Academic Activities (AD):** | **15%** |

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## 2. LECTURERS

| **Coordinator** | |
|---|---|
| **Name:** | **Mª Teresa Navarro Gochicoa** |
| **School:** | **School of Experimental Sciences** |
| **Department:** | **Physiology, Anatomy and Cell Biology** |
| **Area:** | **Plant Physiology** |
| **Office Hours:** | **Wednesdays: 9.30-12.30 and 16.30-17.30**<br>**Fridays: 10.00-12.00**<br>**(with previous appointment through e-mail)** |
| **Office:** | **22-1-15** |
| **E-mail:** | **mtnavgoc@upo.es** |
| **Phone:** | **954977501** |

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## 3. TOPICS

**BASIC LEARNING (EB)**

**I. INTRODUCTION TO THE PHOTOSYNTHESTIC MICROORGANISMS**
**Unit 1.** Introduction to photosynthetic microorganisms.
**Unit 2.** Techniques of culture at laboratory scale.
**Unit 3.** Industrial-scale cultivation techniques.

**II. MICROALGAE IN BIODIESEL PRODUCTION**
**Unit 4.** Production of lipids in microalgae.
**Unit 5.** Obtaining green energy (biofuels) from microalgae.

**III: ENVIRONMENTAL APPLICATIONS OF MICROALGAE**
**Unit 6.** Microalgae in the increase of CO 2 fixation.
**Unit 7.** Potential applications of microalgae in environmental aspects.

**IV: PRODUCTION OF BIOACTIVE AND VALUE ADDED METABOLITES**
**Unit 8.** Production of biologically active metabolites in cyanobacteria.
**Unit 9.** Obtaining products with high added value.
**Unit 10.** Microalgae as a source of pigments.
**Unit 11.** Algae in the diet.

**PRACTICAL LEARNING**

**Practice 1 (1.5 h)**
Preparation of culture media. Inoculation of media for the cultivation of eukaryotic microalgae ( *Chlamydomonas reinhardtii* ).
**Practice 2 (2 h)**
Transformation of microalgae cells *Chlamydomonas reinhardtii*.
**Practice 3 (2 h)**
Biomass collection of microalgae grown in watertight crops. Determination of dry weight and pigments.
**Practice 4 (2.5 h)**
Evaluation of the antioxidant capacity of the microalgae *Chlamydomonas reinhardtii*.
**Practice 5 (3 h)**
Visit to a Research Center where they work with microorganisms photosynthetic with different systems for applied purposes.

**GUIDED ACADEMIC ACTIVITIES**

The students have **7 hours** of directed activities that correspond to:
Works in groups of bibliographic reviews corresponding to the syllabus of

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**The EB topics I, II, III and IV**, as well as the resolution of technical aspects related to microalgae crops. These will be carried out in groups. The choice of work, the follow-up of works and their debate will be supervised by the teachers.