# SYLLABUS

## 1. Course description

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| **Degree:** | **Biotechnology** |
| **Course:** | **Plant Physiology** |
| **Module:** | **Foundations of Chemistry, Microbiology and Genetics** |
| **Department:** | **Physiology, Anatomy and Cell Biology** |
| **Academic Year:** | **2017-18** |
| **Term:** | **First** |
| **ECTS credits:** | **6** |
| **Year:** | **2nd year** |
| **Type:** | **Basic** |
| **Language:** | **Spanish** |

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| **Course Model:** | **B1** |
| **a. Basic learning (EB):** | **60 %** |
| **b. Practical learning (EPD):** | **40 %** |

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## 2. Lecturers

| **Coordinator** | |
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| **Name:** | **Jesús Rexach Benavides** |
| **School:** | **School of Experimental Sciences** |
| **Department:** | **Physiology, Anatomy and Cell Biology** |
| **Area:** | **Plant Physiology** |
| **Office Hours:** | **Mondays and Thursdays: 10.00-12.00 and Tuesdays: 16.00-18.00 (online tutoring is also available)** |
| **Office:** | **22.1.11** |
| **E-mail:** | **jrexben@upo.es** |
| **Phone:** | **954349135** |

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## 3. Topics

BLOCK I: WATER RELATIONS.

UNIT 1: WATER IN CELLS AND VEGETABLE TISSUES

UNIT 2: WATER ABSORPTION AND TRANSPORTATION IN PLANTS

UNIT 3: TRANSPIRATION

ACTIVITY TO DEVELOP IN BLOCK I
The activity proposed in this block of units is the resolution of the questions and problems related to water relations, and that will take place in the classroom practice number 1. This activity will help the student to apply the concepts.

BLOCK II: MINERAL NUTRITION.

UNIT 4: PLANTS NUTRITIONAL REQUIREMENTS

UNIT 5: SOLUTE MOVEMENT THROUGH THE MEMBRANES

ACTIVITY TO BE DEVELOPED IN BLOCK II
The activity proposed in this block of units is the resolution of the issues and problems related to mineral nutrition, and that will take place in the classroom practice number 2. This activity will help the student to apply the concepts Theoretical

BLOCK III: LUMINIC REACTIONS OF PHOTOSYNTHESIS.

UNIT 6: THE PHOTOSYNTHETIC APPARATUS

UNIT 7: TRANSPORT OF ELECTRONS IN PHOTOSYNTHESIS

ACTIVITY TO BE DEVELOPED IN BLOCK III
The activity proposed in this block of topics is practical class number 3 that complements and strengthens the theoretical concepts that the student has acquired. The main objective of this practice is to learn the experimental methodology for measure of the speed of photosynthesis, and how it is affected by the different treatments (light / dark, inhibitor of electron photosynthetic transport).

BLOCK IV: METABOLISM

UNIT 8: ASSIMILATION OF CO 2 IN PLANTS C3

UNIT 9: PHOTORRESPIRATION

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UNIT 10: ASSIMILATION OF CO 2 IN PLANTS C4 AND CAM

UNIT 11: ASSIMILATION OF THE NITROGEN

ACTIVITY TO BE DEVELOPED IN BLOCK IV
The activity proposed in this block of topics is practical class number 4 that complements and strengthens the theoretical concepts that the student has acquired. The main objective of this practice is to learn the experimental methodology for measurement of an enzymatic activity -nitrite reductase-, and to carry out the treatment of experimental data for the correct expression of activity values in their corresponding units.

BLOCK V: DEVELOPMENT

UNIT 13: REGULATORY DEVELOPMENT SUBSTANCES

UNIT 14: PHOTOMORPHOGENESIS

UNIT 15: 15: FLOWERING, DEVELOPMENT OF FRUIT AND GERMINATION OF THE SEEDS

ACTIVITY TO DEVELOP IN BLOCK V
The activities proposed in this block of topics are practical classes number 5 and 6, which complement and strengthen the theoretical concepts that the student has acquired. The objective of practice 5 is to visualize in barley plants the effect that they have the cytokinins on the senescence of the leaf. The goal of practice 6 is learn the experimental methodology for measuring the speed of breathing aerobic in germinated seeds

PRACTICE

PRACTICE 1: PROBLEMS OF WATER RELATIONS. The aim of the first practice is for the student to learn to solve problems related to the knowledge acquired in basic education.

PRACTICE 2: PROBLEMS OF MINERAL NUTRITION.
The aim of the second practice is that the student learns to solve problems related to the knowledge acquired in basic education.

PRACTICE 3: DETERMINATION OF THE PHOTOSYNTHESIS THROUGH OXYGEN ELECTRODE IN CHLOROPLASTY SUSPENSIONS.
The aim of the third practice is the quantification of oxygen evolution in aqueous suspensions of chloroplasts, and the determination of the effect of inhibitors and uncoupling of electron photosynthetic transport on the speed of photosynthesis. It will last for three hours.

PRACTICE 4: DETERMINATION OF THE ACTIVITY NITRITO REDUCTASA IN SUNFLOWER LEAVES.
The student in this practice applies the theoretical knowledge and learns to measure an enzymatic activity. It is also an important objective that they know how to carry out the treatment of the experimental data and finally express the values of activity in their corresponding units. It will last three and a half hours.

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PRACTICE 5: EFFECT OF KINETINE ON THE DELAY OF THE SENESCENCE IN THE SHEETS OF BARLEY.
In this practice, the student applies the acquired concepts about cytokinins. He objective is to visualize the effect of cytokinins in delaying the senescence of the leaf, since it slows down the degradation of chlorophyll, proteins and acids nucleic For this purpose, the degradation of chlorophyll and proteins in leaves of barley incubated in the presence or absence of kinetin, a cytokinin called 6- (furfurylamino) purine. It will last for three hours.

PRACTICE 6: DETERMINATION OF THE AEROPTIC BREATHING RATE IN SEEDS.
The aim of this practice is for the student to learn how to calculate the respiration rate of seeds in germination. Another objective of this practice is for the student to assimilate that the velocity of aerobic respiration is a process clearly influenced by the temperature, since the reactions involved are catalyzed by enzymes. Student has knowledge of the functioning of the oxidative respiration process, and in this practical class is applied to a biological system (germinated seeds), and employs a methodology based on carrying out acid-base evaluations. It will last three and a half hours.