Universidad Zaragoza

**Academic Year/course: 2023/24**

# 27108 - Biochemistry

## Syllabus Information

**Academic year:** 2023/24
**Subject:** 27108 - Biochemistry
**Faculty / School:** 100 - Facultad de Ciencias
**Degree:** 446 - Degree in Biotechnology
**ECTS:** 12.0
**Year:** 2
**Semester:** Annual
**Subject type:** Compulsory
**Module:**

## 1. General information

Basic training subject of the Biotechnology Degree. Enzymology and Metabolic Biochemistry seek to know the processes and mechanisms by which living beings are able to obtain and transform energy and substrates to form their own components and carry out the functions that characterize them. Enzymes are key to enable these vital processes under physiological conditions due to their high efficiency and specificity.

These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the United Nations Agenda 2030 (https://www.un.org/sustainabledevelopment/es/), so that the acquisition of the learning results of the subject provides training and competence to contribute to some extent to their achievement: Goal 3: Health and wellness; Goal 4: Quality Education; Goal 5: Gender equality.

## 2. Learning results

- To understand the concept of enzyme and its general characteristics.
- To know the different kinetic and regulatory aspects of its catalytic activity.
- To understand the mechanisms underlying their catalytic activity.
- To know the basic aspects of the industrial and technological use of enzymes.
- To know and understand the basic principles of bioenergetics and metabolism.
- To know the main metabolic pathways and the organs where they take place.
- To understand in detail the functions of the main metabolic pathways.
- To understand the close interrelationship between the different metabolic pathways.
- To understand and be able to describe in detail some of the mechanisms of metabolic regulation: allosteric and hormonal action and transcription factors.
- To understand the role of transport processes as part of a metabolic transformation and their possible role in its regulation.
- To understand and know some specific examples of metabolic defects that cause diseases.
- To be able to describe the main metabolic events and organs involved in responses to specific metabolic situations such as exercise, acidosis, fasting and pathologies such as diabetes, obesity and cancer.

## 3. Syllabus

***First part: Enzymology*** *(4,5 ECTS, 3,5 Theory and 1 Problems/Seminars)*

- Chemical nature of enzymes, functions and properties.
- Enzyme kinetics.
- Enzyme catalytic strategies and regulation of enzyme activity.
- Enzymatic technology.

***Second part: METABOLIC BIOCHEMISTRY*** *(7.5 ECTS, 5.5 Theory and 2 Problems/Seminars)*

- Introduction to the study of metabolism.
- Carbohydrate metabolism.
- Lipid Metabolism.
- Metabolism of nitrogen compounds.
- Integration of metabolism and metabolic adaptations.

The detailed Program will be available in the corresponding ADD (Anillo Digital Docente) of the subject.

## 4. Academic activities

***Lectures:*** sessions in which the teacher will explain the syllabus of the subject: 90 hours

***Problem Classes:*** problem solving sessions, questions and practical cases posed by the teacher. 26-30 hours

***Seminars:*** sessions where novel issues not included in the program will be addressed and taught, if possible, by other teachers and researchers: 0-4 hours

## 5. Assessment system

The subject is divided into two parts (1st and 2nd midterm) that will be evaluated independently through a single overall written test for each of them.

The degree of fulfilment of the following objectives will be evaluated through it: (a) to know the specific contents of the subject collected in the program, b) to interrelate those contents and c) to apply this knowledge to solve specific problems/questions in a justified manner.

Special emphasis will be placed on objectives b and c.

The test may contain different types of questions in different proportions or they can all be of the same type: development of topics, resolution of problems/questions in a justified manner and multiple-choice questions. The grade for each question will be given in the examination statement.

**FINAL GRADE**: *will be the sum of 35% of the final grade of the first midterm exam plus 65% of the final grade of the second midterm provided that the grade obtained in each of them is equal to or higher than 5 points (out of 10).*

**First midterm exam:** it will comprise the 1st part, Enzymology

**Second midterm exam:** will include the 2nd part, Metabolic Biochemistry