SYLLABUS

1. Course description

Degree:	**Biotechnology**
Course:	**Biochemistry :Metabolism and its Regulation**
Module:	**Biochemistry and Molecular Biology**
Department:	**Molecular Biology and Biochemical Engineering**
Academic Year:	**2017/2018**
Term:	**First**
ECTS credits:	**6**
Year:	**2nd year**
Type:	**Basic**
Language:	**Spanish**

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

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2. Lecturers

Name:	**Francisco J.Bedoya Bergua**
School:	**School of Experimental Sciences**
Department:	**Molecular Biology and Biochemical Engineering**
Area:	**Biochemistry and Molecular Biology**
Office Hours:	**Tuesday, Wednesday and Thursday: 12.00-14.00 h**
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3. Topics

BASIC LEARNING
BASIC TEACHINGS
1. General characteristics of metabolism
1.1 Structure and types of metabolic pathways
1.2 Metabolic regulation and its types

2. The citric acid cycle, the respiratory chain and oxidative phosphorylation
2.1 Role of the cycle in cellular metabolism
2.2 Description of the cycle. Anaplerotic reactions
2.3 Structure of the respiratory and energetic chain of electronic transport
2.4 Oxidative phosphorylation. Structure of ATP synthase
2.5 Control of electronic transport and oxidative phosphorylation

3.Metabolism of carbohydrates
3.1 Glucolysis. Metabolic bases of the Pasteur effect and the Warburg effect
3.2 Pyruvate transformations: fermentations and oxidative decarboxylation
3.3 Route of pentose phosphate
3.4 Gluconeogenesis
3.5 Synthesis and degradation of glycogen

4.Metabolism of lipids
4.1 Plasma lipoproteins
4.2 Degradation of fatty acids
4.3 Synthesis of fatty acids
4.4 Metabolism of isoprenoids
4.5 Metabolism of membrane lipids and icosanoids

5.Metabolism of amino acids
5.1 Degradation of the amino group
5.2 Degradation of the carbon skeleton

6.Metabolism of nucleotides
6.1 Degradation of purine and pyrimidine nucleotides
6.2 Recycling and biosynthesis of purine and pyrimidine nucleotides

PRACTICE LEARNING

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The EPD activities consist of two parts:

1) Laboratory sessions, in which the student will learn to function in the biochemistry laboratory. To do this, he will learn to manage the measurement equipment, carry out experiments that show the metabolic processes of the main biomolecules and, above all, develop the basics of metabolic analysis.
2) Problems development sessions, in which the student will apply the knowledge acquired in the EB to solve problems related to the cellular metabolism.

LABORATORY SESSION 1: SUBCELULAR FRACTIONATION
METHOD OF SEPARATION: Separation of nucleus, mitochondria and cytosol
MARKERS OF DIFFERENT FRACTIONS: Measurement of markers using spectrophotometric techniques.

LABORATORY SESSION 2: OXIDATIVE DAMAGE
OXIDATIVE DAMAGE PRODUCTION
DETERMINATION OF FINAL PRODUCTS
QUANTIFICATION OF THE DAMAGE
QUANTIFICATION OF PROTECTION

LABORATORY SESSION 3: LIPID METABOLISM
SEPARATION AND DETERMINATION OF LIPOPROTEINS
DETERMINATION OF TRIGLYCERIDES

LABORATORY SESSION 4: METABOLISM OF NITROGEN BIOMOLECULES
DETERMINATION OF UREA
DETERMINATION OF URIC ACID
DETERMINATION OF TRANSAMINASES.

LABORATORY SESSION 5: KINETICS OF ENZYMES OF ENZYMES
FOSFORILA N TES OF GLUCOSE
HEXOQUINASE
GLUCOQUINASE

PROBLEM DEVELOPMENT SESSION 1: METABOLISM AND BIOLOGICAL OXIDATIONS
BIOENERGY
CYCLE ACID CYCLE
OXIDATIVE PHOSPHORYLATION

SESSION OF DEVELOPMENT OF PROBLEMS 2: METABOLISM OF CARBOHYDRATES

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GLUCOLYSIS
METABOLISM OF GLUCOGEN
PENTOSE PHOSPHATE PATHWAY

PROBLEM DEVELOPMENT SESSION 3: LIPID METABOLISM
LIPOLYSIS
SYNTHESIS OF CETONIC BODIES
BIOSYNTHESIS OF CHOLESTEROL AND FATTY ACIDS