29240 - Metabolism and Gene Expression

Información del Plan Docente

Academic Year	2017/18
Faculty / School	229 - Facultad de Ciencias de la Salud y del Deporte
Degree	441 - Degree in Human Nutrition and Dietetics
ECTS	8.0
Year	1
Semester	Second semester
Subject Type	Basic Education
Module	---

1.General information

1.1.Introduction

1.2.Recommendations to take this course

1.3.Context and importance of this course in the degree

1.4.Activities and key dates

2.Learning goals

2.1.Learning goals

2.2.Importance of learning goals

3.Aims of the course and competences

3.1.Aims of the course

3.2.Competences

4.Assessment (1st and 2nd call)

4.1.Assessment tasks (description of tasks, marking system and assessment criteria)

5.Methodology, learning tasks, syllabus and resources

5.1.Methodological overview

This is a basic course which treats that students assimilate and use in a proper manner the biochemical and molecular concepts related to nutritional and physiological processes. Thus, this subject is structured in different activities including: i) participatory lectures; ii) laboratory sessions; iii) exercises and problems; iv) preparation and presentation of an essay about a scientific revision related to Nutrition.

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5.2.Learning tasks

The master classes will provide the students the essential concepts, the scientific vocabulary and the metabolic and molecular view necessary to understand the enzymatic processes that happen in the cells to obtain energy from food or to use this energy in biosynthetic pathways.

The objective of practical sessions, which include laboratory work and problems resolution, is that students can apply theoretical concepts to solve new situations and they can achieve a less superficial understanding of reality.

Finally, the preparation and public presentation of a scientific essay will allow students to understand and expose the knowledge included in a scientific publication. This activity can help the students to learn how important is to increase and to update our knowledge constantly. Besides, the public exposition of the work, will be good for students to face other difficulties of this activity and it is a chance for evaluate their personal work.

5.3.Syllabus

LECTURES (60 hr)

I. THE CELL: 1.- Biomembranes. 2.- Intracellular organization and functions I: The nucleus. 3.- Intracellular organization and functions II: Organelles. 3a. Protein distribution and transport: Endoplasmic reticulum, Golgi apparatus and lysosomes. 3b. Bioenergetics and metabolism: Mitochondria, chloroplasts y peroxisomes. 4.- Intracellular organization and functions III: Cytoskeleton. 5.- Cell division and cell cycle. 6.- Cell signalling, differentiation y oncogenesis.

II. ENZYMES: 7.- Enzymes kinetics and action mechanisms. 8.- Modification and regulation of enzymatic activity.

III. METABOLISM: 9.- Introduction to metabolism. 10.- Photosynthesis and CO 2 assimilation in plants. 11.- Glucose oxidation pathways. 12.- Citric acid cycle. 13.- Oxidative phosphorylation. 14.- Carbohydrate biosynthesis. 15.- Glycogen synthesis and degradation. 16.- Simple lipid metabolism: fatty acids, triacylglycerols and lipoproteins. 17.- Complex lipid metabolism. 18.- Metabolism of nitrogen compounds: biosynthesis and utilization. 19.- Metabolism of nitrogen compounds: amino acids and derivatives. 20.- Metabolism of nucleic acids. 21.- Metabolic integration and control.

IV. EXPRESSION AND TRANSMISSION OF GENETIC INFORMATION: 22.- DNA replication and repair. 23.- DNA transcription. 24.- Protein translation. 25.- Regulation of gene expression.

LABORATORY SESSIONS (12.5 hr)

5 sessions, 2.5 hr/each.

1. Cell diversity

2. Determination of protein concentration

3. Measurement of enzyme activity

4. DNA extraction and purification

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5. Polymerase chain reaction

SEMINARS (6 hr)

3 sessions, 2 hr/each.

The students will make a presentation on a research topic related to nutrition.

5.4.Course planning and calendar

For further details concerning the timetable, classroom and further information regarding this course please refer to the Facultad de Ciencias de la Salud y el Deporte, website (https://fccsyd.unizar.es/academico/horarios-y-calendarios)

5.5.Bibliography and recommended resources