

Academic Year: ( 2022 / 2023 )

Review date: 20-06-2022

Department assigned to the subject: Department of Bioengineering and Aerospace Engineering

Coordinating teacher: LEON CANSECO, CARLOS

Type: Compulsory ECTS Credits : 6.0

Year : 3 Semester : 2

**REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)**

It is recommended to have completed satisfactorily Biophysics 1: Molecular, cellular and tissular physics biology, Biología física molecular, celular y tisular

**DESCRIPTION OF CONTENTS: PROGRAMME**

1. Introduction to "omic" technologies
2. Omic integration and biomedical applications
3. Introduction to biological networks and Systems Biology. Analysis of collective properties in systems of interacting components
4. Gene regulatory and protein-protein interaction networks
- 5 Metabolic networks and disease networks
6. Introduction to Neurosciences: Modeling the brain and the nervous system
7. Introduction to Synthetic Biology. Synthetic Biology circuits
8. Modeling biological systems. Logic circuits.
9. Metabolic engineering. Minimal cells.
10. Biomedical applications of Synthetic Biology

**LEARNING ACTIVITIES AND METHODOLOGY**

- AF1. THEORETICAL-PRACTICAL CLASSES. Knowledge and concepts students must acquire. Receive course notes and will have basic reference texts. Students partake in exercises to resolve practical problems
- AF2. TUTORING SESSIONS. Individualized attendance (individual tutoring) or in-group (group tutoring) for students with a teacher. Subjects with 6 credits have 4 hours of tutoring/ 100% on-site attendance.
- AF3. STUDENT INDIVIDUAL WORK OR GROUP WORK. Subjects with 6 credits have 98 hours/0% on-site.
- AF8. WORKSHOPS AND LABORATORY SESSIONS. Subjects with 3 credits have 4 hours with 100% on-site instruction. Subjects with 6 credits have 8 hours/100% on-site instruction.
- AF9. FINAL EXAM. Global assessment of knowledge, skills and capacities acquired throughout the course. It entails 4 hours/100% on-site
- AF8. WORKSHOPS AND LABORATORY SESSIONS. Subjects with 3 credits have 4 hours with 100% on-site instruction. Subjects with 6 credits have 8 hours/100% on-site instruction.
- MD1. THEORY CLASS. Classroom presentations by the teacher with IT and audiovisual support in which the subject's main concepts are developed, while providing material and bibliography to complement student learning
- MD2. PRACTICAL CLASS. Resolution of practical cases and problem, posed by the teacher, and carried out individually or in a group
- MD3. TUTORING SESSIONS. Individualized attendance (individual tutoring sessions) or in-group (group tutoring sessions) for students with teacher as tutor. Subjects with 6 credits have 4 hours of tutoring/100% on-site.
- MD6. LABORATORY PRACTICAL SESSIONS. Applied/experimental learning/teaching in workshops and laboratories under the tutor's supervision.

**ASSESSMENT SYSTEM**

- SE1. FINAL EXAM. Global assessment of knowledge, skills and capacities acquired throughout the course. The percentage of the evaluation varies for each subject between 60% and 0%.
- SE2. CONTINUOUS EVALUATION. Assesses papers, projects, class presentations, debates, exercises, internships and workshops throughout the course. The percentage of the evaluation varies for each subject between 40% and 100% of the final grade.

Specifically, in this course, the continuous evaluation is 50%, and consists of the presentation of a work

project (25%), the delivery and presentation of a critical commentary of a scientific article (15%), and the completion of small exercises during practical classes (10%).

**% end-of-term-examination:** 50

**% of continuous assessment (assignments, laboratory, practicals...):** 50

#### BASIC BIBLIOGRAPHY

- Natalie Kuldell PhD., Rachel Bernstein, Karen Ingram, Kathryn M Hart Synthetic Biology in the Lab, BioBuilder, 2015

- Uri Alon An Introduction to Systems Biology: Design Principles of Biological Circuits, Chapman & Hall/CRC Mathematical and Computational Biology, 2006