Biophysics 1: Molecular, Cell and Tissue Physical Biology

Academic Year: (2022 / 2023) **Review date: 20-06-2022**

Department assigned to the subject: Bioengineering Department

Coordinating teacher: MEDRAÑO FERNANDEZ, IRIA

Type: Compulsory ECTS Credits : 6.0

Year : 2 Semester : 2

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

None

DESCRIPTION OF CONTENTS: PROGRAMME

1. Regulation of Gene Expression. From genes to proteins.
2. Biosignaling.
3. Regulation of the Cell Cycle
4. Oncogenes, Tumor Suppressor Genes, and Programmed Cell Death
5. Membrane Structure and Function. Channels and Transporters. Regulation of Membrane Transport of Proteins and Signaling Receptors.
6. The Cell Cytoskeleton. Cell Mechanics. Mechanotransductio
7. Molecular Machines, Motors, and Nanoscale Biophysics. Biophysics of molecular motors (cytoskeletal and non-cytoskeletal)
8. Energy Generation in Mitochondria and Chloroplasts
9 Principles of Tissue Organization

Laboratory practices:
1. Bacterial transformation and isolation of DNA plasmids
2. Human cell culture techniques

LEARNING ACTIVITIES AND METHODOLOGY

THEORETICAL-PRACTICAL CLASSES. In these lectures, the knowledge and concepts that students must acquire during the lessons. They will receive the course notes and basic reference texts. Students will share exercises to resolve practical problems and participate in master lectures. Practical lectures will be imparted in reduced groups.
TUTORING SESSIONS. Individualized attendance (individual tutoring) or in-group (group tutoring) is available for any student upon request.
STUDENT INDIVIDUAL WORK OR GROUP WORK.
LABORATORY PRACTICAL SESSIONS. Applied/experimental learning/teaching in workshops and laboratories in-site under a tutor's supervision.

ASSESSMENT SYSTEM

The evaluation method will consist on CONTINUOUS ASSESMENT (42,5%), a FINAL EXAM (42,5%) and a test on laboratory practices (15%).
Continuous assessment will consist on: 60 % Molecular Biology (2 exams and a work group) + 40% Cell Biology (1 exam and a work group).

% end-of-term-examination:	42
% of continuous assessment (assigments, laboratory, practicals…):	58

BASIC BIBLIOGRAPHY

- Bruce Alberts et al Essential Cell Biology, Garland Publishing, Inc, 4th and 5th ed. 20202

- Harvey Lodish et al Molecular Cell Biology, Ed. Freeman and Company, New York., 5th Edition

- J. Sambrook, E.F. Fritash and T. Maniatis Molecular Cloning: A laboratory Manual, Ed. Cold Spring Harbour Press., 3rd Edition

- Jennie P. Mather and David Barned Animal Cell Culture Methods, Ed. Associated Press..

ADDITIONAL BIBLIOGRAPHY

- Bruce Alberts et al Molecular Biolgy of the Cell, Garland Publishing, Inc. New York and London, 5th Edition

- Bruce Alberts et al Molecular Biology of the Cell, Garland Science, 6th ed.

- Lizabeth A. Allison Fundamental Molecular Biology, Ed. Wiley-Balckwell.