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| Course Unit | Cellular Biology | Field of study | Biology and Biochemistry |
| Bachelor in | Dietetics and Nutrition | School | School of Health |
| Academic Year | 2019/2020 | Year of study | 1 |
| Type | Semestral | Semester | 1 |
| Workload (hours) | 135 | Contact hours | T - , TP 30, PL 30, TC - , S - , E - , OT 6, O - |
| Level | 1-1 | ECTS credits | 5.0 |
| Code | 8149-501-1102-00-19 | | |

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) Maria José Miranda Arabolaza

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
Know the complexity of the cell as structural and functional unit of all living beings.

Prerequisites

Before the course unit the learner is expected to be able to:
NONE

Course contents

THEORETICAL-Biomembranes Macrotransport Microtransport Specialities of membrane Extracellular matrix Nucleus Endoplasmic reticulum Golgi apparatus Lysosomes Mitochondria Peroxisomes Cytoskeleton Cell communication Cell cycle Meiose Gametogenesis PRACTICE-Microscopy Micrometria Bacteria Cellular composition of blood Permeability of biomembrane Globular resistance Caryotipe Polytene chromosome Catalase activity Mitosis Extraction of DNA Cells in meiosis

Course contents (extended version)

- PRACTICAL CLASSES Microscopy: • Optical microscope Types The electron microscope Types. Micrometria
 - Bacteria: saliva/yogurt Comparison cellular composition of blood analyzed with Wright's stain method
 - Effects of heat, freezing and solvents in the biomembranes permeability.
 - Behavior of animals cells in different osmolarities
 - Preparation of karyotypes
 - Observation polytene chromosomes of salivary glands of *Drosophila melanogaster*
 - Catalase activity
 - Observation of cell divides by mitosis.
 - DNA extraction, quantification and purity determination from living tissue.
 - Observation of cell divides by meiosis.
- THEORETICAL CELL ORGANIZATION -- Biological Membranes. The lipid bilayer . Membrane proteins
- Membrane transport of small molecules. Diffusion. Active ion transport .
- Transport into the cell of large molecules and particles. Endocytosis and exocytosis. Transcytosis
- Specialities cell membrane. Cell junctions tight junctions, adherens junctions and gap junctions
 - Microvilli cilium, flagellum, stereocilia
- Extracellular matrix of animals. Components of the extracellular matrix . Functions
- Nucleus Constitution Molecular structure, function of the genetic material Chromatin and chromosomes
- Endoplasmic Reticulum Structure and types Relationship with cellular organelles/structures Functions
 - Structure and function of the ribosomes
- Golgi apparatus. Framework . Compartimentation. Functions
- Lysosomes . Ultra-structure . The lysosomes and the intracellular digestion. Lysosomal diseases
- Mitochondrion Ultra-structure, composition and functions. Mitochondrial DNA.
- Peroxisomes . Structure. Functions. Peroxisomical diseases
- Cytoskeleton . Membership, organization and functional significance
- Cell communication. Types of signals. Recetors
- Cell Cycle. Overview of the cell cycle. Mitosis. Control of the cell cycle events. Apoptosis
- Meiosis and fertilization . Meiosis . Eggs . Sperm . Fertilization

Recommended reading

- ALBERTS, B. et al. (2010) – *Biología Molecular de la Célula*, 5ª ed. Ed. Omega, Barcelona.
- AMABIS & MARTHO (2004) - *Biologia dos organismos*, 2ª ed. Ed. Moderna, São Paulo.
- AZEVEDO, C. & C. E. SUNKEL (2012) – *Biologia Celular e Molecular*, 5ª ed. Edições Lidel, Lisboa.
- LODISH et al. (2005) - *Biología Celular y Molecular*, 5ª ed. Médica Panamericana
- BERG, J. M. ; J. L. TYMOCZKO & L. STRYER (2004) - *Bioquímica*, 5ª ed. Guanabara Koogan

Teaching and learning methods

Theoretical-practices - Methodology actively using the multimedia, texts and question-answer sessions. Practical classes - carrying out practical laboratory with preparation of their reports.

Assessment methods

- Theoretical and Practices - (Regular) (Final)
 - Intermediate Written Test - 30% (Practices - Students perform one test during the semester)
 - Portfolio - 10% (Practices - At the end of the practical classes they deliver their portfolio to be evaluated)
 - Final Written Exam - 60% (Theoretical - Students perform a test)
- Theoretical and Practices - (Student Worker) (Final, Supplementary, Special)
 - Final Written Exam - 40% (Practices - Students perform a test)
 - Final Written Exam - 60% (Theoretical - Students perform a test)

Language of instruction

Portuguese

Electronic validation

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|------------------------------|--------------------------------------|-------------------------------|---------------------------------------|
| Maria José Miranda Arabolaza | Ana Maria Geraldes Rodrigues Pereira | Teresa Isaltina Gomes Correia | Adília Maria Pires da Silva Fernandes |
| 04-11-2019 | 05-11-2019 | 06-11-2019 | 06-11-2019 |