Course Guide 2018/2019

Biology

Biología

Bachelor in Dentistry

Mode: On Campus

Index

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Biology

Module: **Biomedical Sciences.**

Subject: **Biology.**

Level: **Basic.**

No. of Credits: **6 ECTS.**

Academic Session: **1st Course – 2nd Semester.**

Course Professors: **José Antonio Pellicer Balsalobre.**

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Office Hours: **Prior request for appointment by e-mail.**

Professor coordinating the Module: **Sonia Sánchez Bautista.**

Brief Description

This course will provide a basic overview of the eukaryotic cell, describing the structure and function of the different cell organelles. It will also introduce the terminology and concepts necessary to understand other subjects such as Biochemistry and Human Physiology based on the new discipline of Biology. Understanding the cell at its molecular level is an active area of research that is fundamental for all Biological Sciences. The completion of the sequence of the human genome and the advances in Cellular and Molecular Biology are opening new horizons in the practice of Dentistry.

Prerequisites

None.

Objectives

1. To know the concept of a living being, its functions, and its structure at the molecular and cellular level.
2. To study the differences between the prokaryotic cell and the eukaryotic cell.
3. To know the cellular membrane of the eukaryotic cell and its cellular communication mechanisms.
4. To know each of the organelles and main components of the cells in the morphological, molecular functional aspects, their biogenesis, and their basic biopathological modifications.
5. To know the human genome, the mechanisms of recombination, repair, and regulation.
6. To know the mechanisms of cellular division, and its transcendence for the life of organisms.
7. To know cellular aging and death. Cellular and molecular bases of apoptosis and necrosis.

Competencies and Learning Outcomes

Basic competencies

MECES1: Students have demonstrated that they possess and understand the knowledge in an area of study that starts from the basis of general secondary education, and is usually found at a level that, although supported by advanced textbooks, also includes some aspects that imply knowledge coming from the forefront of their field of study.
MECES2: Students know how to apply their knowledge to their work or vocation in a professional manner and they possess the skills that are usually demonstrated through the elaboration and defense of arguments and through problem-solving within their area of study.
MECES3: Students have the ability to gather and interpret relevant data (usually within their area of study) to make judgments that include a reflection on relevant issues of a social, scientific, or ethical nature.
MECES4: Students can transmit information, ideas, problems, and solutions to a specialized and non-specialized public.
MECES5: Students have developed the learning skills necessary to undertake later studies with a high degree of autonomy.

General competencies

G11: To understand the basic biomedical sciences on which Dentistry is based to ensure correct oral and dental care.
G12: To understand and recognize the structure and normal function of the stomatognathic apparatus at the molecular, cellular, tissue, and organ levels in the different stages of life.

Interdisciplinary competencies

CT3: The ability to work as a team and to interact with other people in the same or different professional field.

Specific competencies

CBM1: To understand the biomedical sciences on which Dentistry is based to ensure correct oral and dental care. Among these, appropriate subject matter should include:

- Embryology, anatomy, histology and physiology of the human body.
- Genetics, biochemistry, molecular and cellular biology.
- Microbiology and immunology.

CBM2: To know the morphology and function of the stomatognathic apparatus, including specific appropriate subject matters of embryology, anatomy, histology, and physiology.

Methodology

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Methodology	Hours	Hours of Classroom Work	Hours of Non-Classroom Work
Classroom based Classes	30	60 hours (40 %)	
Academic Tutorials	6		
Practicums	15		
Seminars	6		
Classroom Evaluations	3		
Personal Study	63		90 hours (60 %)
On-line Tutorials	9		
Resolution of Exercises and Practical Cases	9		
Project Completion and Oral Presentations	9		
TOTAL	150	60	90

Syllabus

Theoretical instructional program

- Topic 1: Cellular biology. Study methods and techniques.
- Topic 2: Cellular membrane. Structure and composition.
- Topic 3: Macrotransport across the cellular membrane.
- Topic 4: Specializations of the cellular membrane.
- Topic 5: Cytoskeleton.
- Topic 6: Membranous organelles: Reticulum, Golgi, and lysosomes.
- Topic 7: Mitochondria and Peroxisomes.
- Topic 8: Nucleus.
- Topic 9: Nucleic acids, replication, recombination, and repair.
- Topic 10: Nucleolus and transcription.
- Topic 11: Ribosomes and translation.
- Topic 12: Cellular cycle, phases, and control. Cellular division.
- Topic 13: Cellular death. Necrosis and Apoptosis.

Practical instructional program

1. Introduction to microscope handling. Detailed study of the parts of the light field optical microscope. Handling and care of the optical microscope.
2. Preparation of samples for the optical microscope.
3. Observation under the optical microscope of different cell types subjected to different types of staining.
4. Viewing images of different types of optical and electron microscopy.

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5. Cellular division. Mitosis.

Relationship to Other Courses of the Study Plan

Within the framework of the Basic Sciences, the subject provides the student, along with other subjects within the Bachelor's Degree in Dentistry (such as Biochemistry, Histology, Anatomy and Human Physiology) with basic knowledge essential to understanding and using the discoveries that continue to enhance professional practice in a rational way.

Grading System

For the June/September Sessions:

1. **Theoretical exams (70%):** Exams (or evaluative tests) will be carried out with theoretical-practical questions and resolution of assumptions that include the contents of the material studied.
2. **Practical exams (30%):** The practicums and/or seminars will be evaluated through different grading systems (practical exercises, completion and exhibition of projects, clinical cases, etc.…) that include the practical content worked on.
3. **Academic tutorials:** The student's participation will be evaluated though different means such as forums, chats, videoconferences, self-evaluations, activities proposed by the professor, and/or debates.

The student shall pass the subject when the weighted average is equal to or greater than 5 points and all the parts that make up the grading system have been passed, with an overall weight equal to or greater than 20%.

If the student has less than 5 in any of the parts with a weight equal to or greater than 20%, the subject will be suspended, and the student must retake the part(s) in the next session within the same academic year. The suspended part(s) in official sessions (February/June) will be saved for successive sessions that are held in the same academic year.

In the event that the subject is not passed in the September session, the passed parts will not count for successive academic years.

The grading system (RD 1.125/2003. of September 5) shall be the following:

0-4.9 Suspended (SS)

5.0-6.9 Passed (AP)

7.0-8.9 Excellent (NT)

9.0-10 Outstanding (SB)

Honorable mention may be granted to students who have earned a grade equal to or greater than 9.0. This number may not exceed 5% of the total number of students enrolled in a subject in the corresponding academic year, unless the number of students enrolled is less than 20, in which case only a single honorable mention may be granted.

Bibliography and Reference Sources

Basic Bibliography

- La Célula [*The Cell*]. Cooper GM y Hausman RE. 7ª ed. Madrid: Marban; 2017.
- Biología Molecular de la célula. [*Molecular Biology of the Cell*] Alberts B et al. 6ª ed. Barcelona: OMEGA; 2016.
- Biología celular biomédica. [*Biomedical Cellular Biology*] Calvo A. 1ª ed. Madrid: Elsevier; 2015.
- Biología celular. [*Cellular Biology*] Paniagua R. et al. 3ª ed. Madrid: McGraw-Hill Interamericana; 2007.
- Técnicas en Histología y Biología celular. [*Techniques in Histology and Cellular Biology*] Montuenga Badía, et al. 2ª ed. Barcelona: Elsevier Masson; 2014.
- Introducción a la Biología celular. [*Introduction to Cellular Biology*] Alberts, B. et al. 3ª ed. Buenos Aires: Médica Panamericana; 2011.
- Biología celular y molecular. [*Cellular and Molecular Biology*] Lodish H. et al. 7ª ed. Buenos Aires: Médica Panamericana; 2016.
- Biología celular y molecular: conceptos y experimentos. [*Cellular and Molecular Biology: Concepts and Experiments*] Karp, G. 6ª ed. México: McGraw-HillInteramericana; 2011.

Additional Bibliography

- Citología Práctica. [*Practical Cytology*] Vázquez JJ, López Díaz Del Corral J. 3ª ed. Pamplona: Ed. Universidad de Navarra; 1991.
- El mundo de la célula. [*The World of the Cell*] Becker, W. M. et al. 6ª ed. Madrid: Pearson Educación; 2007.
- Related Scientific Articles.

Related Websites

- Atlas of the electron microscope for microscopic cytology, histology and organography. This includes images and videos of the Visible Human, as well as a complete glossary: www.uni-mainz.de/FB/Medizin/Anatomie/workshop/EM/EMAtlas.html
- The Cell. An atlas of plant and animal histology: http://webs.uvigo.es/mmegias/inicio.html
- Scientific databases (NCBI): http://www.ncbi.nlm.nih.gov/pubmed

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Study Recommendations

Study of the subject is recommended on a daily, continuous, and orderly basis, in order to keep up with classes and seminars.

Teaching Materials

Classrooms equipped with Internet and audiovisual media, as well as laboratories, will be used. In the laboratory, the necessary instruments and equipment will be made available for the practicums including: microscopes, cuvettes and staining grids, dyes, microscopic samples, etc.

Tutorials

Brief Description

In academic tutorials, the focus will be to work on Decree No. 359/2009, of October 30th, which establishes and regulates the educational response to the diversity of students in the Autonomous Community of the Region of Murcia.
The activities that are carried out in the Academic Tutorials on this subject are:

- Personal orientation on the contents of the subject and the grading systems.
- Consolidation of knowledge, abilities, skills and attitudes of group work, and oral and written communication.
- Planning and promoting student learning through the provision of bibliographic and documentary sources.
- Advice on how to approach the activities of the practical seminars.

The University also has a Special Body of Tutors that conducts personal tutoring with students enrolled in the degree. The personal tutor accompanies the students throughout the university phase. You can check the following link:

http://www.ucam.edu/servicios/tutorias/preguntas-frecuentes/que-es-tutoria

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