69300 - Fundamentals of Anatomy, Physiology, Pathology and Therapeutics

Información del Plan Docente

Academic Year	2017/18
Faculty / School	110 - Escuela de Ingeniería y Arquitectura
Degree	330 - Complementos de formación Máster/Doctorado 547 - Master's in Biomedical Engineering
ECTS	12.0
Year	---
Semester	Indeterminate
Subject Type	ENG/Complementos de Formación, Compulsory
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

The methodology followed in this course is oriented towards achievement of the learning objectives. A wide range of teaching and learning tasks are implemented, such as lectures where the main contents are presented and discussed; lab sessions, operating room sessions (OR), practical tasks based on real application, and specific research activities.

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5.2.Learning tasks

The course includes the following learning tasks:

- **A01 Lectures** (95 hours). They will take place in the classroom. Students are expected to participate actively in the class
- **A03 Laboratory sessions** (7 hours). Two lab sessions are carried out. They may take place in research labs of I3A or in research labs of the Faculty of Veterinary.
- **A04 OP practice sessions** (8 hours). They will take place in the operating rooms of the Clinical Universitary Lozano Blesa Hospital and Miguel Servet Hospital.
- **A06 Tutorials**. Students may ask and solve any questions they might have about unclear contents of the course
- **A08 Assessment.** The student will take an exam and submit several reports from the lab sessions and the practical tasks.

5.3.Syllabus

The course includes the following learning tasks:

Section 1. Fundamentals of Anatomy and Cell Biology

Theory

1. The cell
2. Cellular organelles
3. Mitosis and Meiosis. General Embriology
4. Histology I
5. Histology II
6. Histology III
7. Introduction to Anatomy
8. Anatomy of the Nervous System
9. Anatomy of the Urinary System
10. Anatomy of the Cardiovascular and respiratory Systems
11. Anatomy of the Digestive System
12. Anatomy of the Musculoskeletal System
13. Senses Organs

Practice

- Blood smear
- Operation of a pathology diagnosis laboratory
- Histology
- Osteology will be integrated within lectures

Section 2. Fundamentals of Physiology

Theory

1. The concept of Physiology
2. Homeostasis. Internal environment and body fluids. Metabolism
3. Transmembrane transport
4. Physiology of excitable tissues. Membrane potential. Action potential. Genesis and conduction
5. Transmission of nerve impulses. Synapses
6. Skeletal muscle physiology
7. Neuromuscular junction. Excitation contraction coupling
8. Functional structure of the nervous system

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9. Sensitive functions. Sensory receptors. Receptors classification
10. Regulation of motor activity
11. Electroencephalography
12. Renal physiology
13. General functions of the cardiovascular system
14. Electrical activity of the heart
15. Mechanical activity of the heart
16. Regulation of cardiac activity
17. Arterial pressure. Microcirculation
18. Venous and lymphatic return
19. Mechanics of respiration
20. Respiratory membrane. Transport of gases
21. Digestive physiology
22. General mechanisms of the endocrine system

Practice

- Blood types
- The electrocardiogram (EKG)
- Blood pressure
- Spirometry

Section 3. Pathology and Therapeutic Basis

Theory

1. Concept of health and disease
2. Pathology. Clinic and diagnosis of diseases: Diseases and syndromes
3. Bioethics
4. Digestive system: function and pathology
5. Respiratory system: function and pathology
6. Vascular system: function and pathology
7. Musculoskeletal system: Function and Pathology
8. Medical (pharmacology), surgical, radiotherapeutic diseases treatment
9. Bases and foundations of Surgery
10. Current surgery in 21st century
11. Minimally invasive surgery and perspectives
12. Bioengineering and surgery.
13. M.B.E. and Research in surgery.

OP practice sessions in surgical services at University Hospitals

5.4.Course planning and calendar

Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course, will be provided on the first day of class or please refer to the EINA website.

5.5.Bibliography and recommended resources

- Silverthorn, Dee Unglaub. Fisiología humana : un enfoque integrado / Dee Unglaub Silverthon ; con la colaboración de Bruce R. Johnson y William C. Ober, coordinador de ilustraciones, Claire W. Garrison, ilustradora, Andrew C. Silverthorn, consultor crítico . - 6ª ed. Buenos Aires ; Madrid [etc.] : Editorial Médica Panamericana, cop. 2014
- Fox, Stuart Ira. Fisiología humana / Stuart Ira Fox . - 13ª ed. México [etc.] : McGraw-Hill Education, cop. 2014
- Sobotta. Atlas de Anatomía humana. Editorial médica panamericana
- Stevens. Histología humana. Editorial Mosby. Año 2006
- Ross, Pawlina y Barnash. Atlas de Histología descriptiva. Editorial médica panamericana

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- Guyton, A. C. y Hall, J. E. Tratado de Fisiología Médica (12ª Ed). McGraw Hill-Interamericana, 2011
- Arteaga Martínez, García Peláez. Embriología humana y Biología del desarrollo. Editorial panamericana
- Alberts B, Johnson A, Lewis J, Raff M, Roberts K, Walter P. 2004. *Biología Molecular de la Célula, 4ª edn. Omega. Barcelona*