27104 - Physiology

Información del Plan Docente

Academic Year	2016/17
Academic center	100 - Facultad de Ciencias
Degree	446 - Degree in Biotechnology
ECTS	6.0
Course	1
Period	Second semester
Subject Type	Basic Education
Module	---

1.Basic info

1.1.Recommendations to take this course

1.2.Activities and key dates for the course

For students enrolled in the subject, places, times and dates of lectures and practical sessions will be public via Bulletin Board advertisements of the grade on the platform Moodle at the University of Zaragoza, https://moodle2.unizar.es/add/, and in the moodle page for the course. These routes will be also used to communicate enrolled students their distribution by groups of practical sessions, which will be organized by the coordination of degree. Provisional dates will be available on the website of the Faculty of Sciences in the corresponding section of the Degree in Biotechnology: https://ciencias.unizar.es/grado-en-biotecnologia.

In this web there will be also available the dates of exams.

2.Initiation

2.1.Learning outcomes that define the subject

2.2.Introduction

3.Context and competences

3.1.Goals

3.2.Context and meaning of the subject in the degree

3.3.Competences

3.4.Importance of learning outcomes

4.Evaluation

5.Activities and resources

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5.1.General methodological presentation

The learning process designed for this course follows an orderly step-wise process, so that the course starts with the study of basic and integration concepts which are mainly worked through **lectures** , then it introduces the student to develop skills involving procedural, integration and understanding skills of the applications of the subject to be worked through various activities in small groups in **practical sessions** .

To better track the learning process students will be encouraged to use the **tutoring/office hours** through various systems and methods: conventional tutoring or more specific assistance related to practical work.

Communications, announcements, and supplementary materials will be provided via Moodle in the **Anillo Digital Docente** (intranet ADD).

5.2.Learning activities

Participatory lectures : basic concepts of the subject are showed, directing students towards the acquisition of skills and learning outcomes. Audiovisual support material will be used and students could find it in the intranet ADD. During these activities, students will be encouraged to be participatory and dynamic. This activity occupies 4 ECTS, 40 hours in the lecture room.

Practical sessions occupying 2 ECTS, 20 hours spread over six sessions of 3 or 4 hours including:

a) Laboratory sessions: students will have the opportunity to perform functional examinations of the main physiological parameters on animal or human samples.

All students will be informed about the risks that may have the realization of the practices of this subject, and if dangerous products are handled, and what to do in case of accident. To perform them is compulsory to sign a commitment to comply with lab standards and safety. It is the student's responsibility to be aware of all such issues and act in an extremely cautious manner to avoid any potential causes for accidents in the laboratory. For more information, see the information for students of the Occupational Health and Safety Unit: http://uprl.unizar.es/estudiantes.html

b) Physiology cases: the student should solve problems about cases of alteration or adaptation of function, in order to integrate and apply his theoretical knowledge.

c) Computer simulations: analysing physiological parameters under simulation and different experimental conditions, the student is able to understand how the different systems and organs are integrated and regulated.

Before each session, students will have available the protocol of the practice. At the end of it, students submit to the teacher a laboratory assignment with answers to questions about the practice performed and the results obtained. Along with the degree of participation and teamwork done, this assignment will grade this part of the course.

Tutorials: both individual and grouped, for guidance in the teaching-learning of the subject.

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Personal Study: From all other activities, students should be responsible for creating diagrams and structured work programs.

5.3.Program

LECTURE TOPICS:

I. INTRODUCTION TO THE PHYSIOLOGY
1- The concept of Physiology. Homeostasis. Internal environment and body fluids.

II. PHYSIOLOGY OF THE NERVOUS SYSTEM
2- Physiology of excitable tissues. Membrane potential. Action potential. Conduction and transmission of nerve impulses. Synapses.

3- Sensitive functions. Sensory receptors. Receptors classification.

4- Chemoreception: olfactory and taste sensitivity.

5- Mechanoreception: Superficial tactile sensitivity. Proprioception. Hearing sensitivity. The vestibular system.

6- Thermoreception. Electroreception. Nociception. Photoreception.

7- Regulation of motor activity. Integration centers. Effector organs and nerve pathways.

8- Regulation of the vegetative functions. The autonomic nervous system.

III. INTERNAL ENVIRONMENT. BLOOD.
9- The general functions of blood. Components. Functions of erythrocytes and leukocytes.

10- Physiological hemostasis. Coagulation. Fibrinolysis. Anticoagulants.

IV - SKELETAL MUSCLE PHYSIOLOGY

11- Skeletal muscle contraction

V. CARDIOVASCULAR PHYSIOLOGY.

12- General functions of the cardiovascular system

13- Electrical and mechanical activity of the heart

14- Regulation of cardiac activity

15- Arterial pressure

16- Microcirculation. Venous and lymphatic return.

VI. RENAL PHYSIOLOGY

17- Functions of the kidney. Urine formation

18- Ultrafiltration and tubular function. Mechanisms of concentration and dilution of urine. Micturition.

19- Renal regulation of the volume and composition of extracellular fluid

20- Regulation of acid-base balance.

VII. RESPIRATORY PHYSIOLOGY.

21- General functions of the respiratory system. Functions of the upper airways

22- Mechanics of respiration.

23- Respiratory membrane. Transport of gases .

24- Regulation of respiration

VIII. DIGESTIVE PHYSIOLOGY AND NUTRITION.

25- Introduction to digestive processes: motility, secretion, absorption and regulation

26- Oral cavity functions

27- Functions of the stomach.

28- Pancreas, liver and gallbladder functions.

29- Small and large intestine functions. Defecation.

30-. General principles of Nutrition and food intake control.

IX. ENDOCRINE SYSTEM PHYSIOLOGY

31- General mechanisms of the endocrine system.

32- Hypothalamic-pituitary axis.

33- Thyroid hormones.

34- Hormones of the endocrine pancreas.

35- Hormones of the adrenal gland.

36- Hormonal control of calcium-phosphate metabolism.

X. REPRODUCTIVE PHYSIOLOGY

37- General characteristics of the reproductive function. Types of reproduction and its regulation.

38- Reproductive physiology of the male.

39- Reproductive physiology of the female. Reproductive cycles.

40- Pregnancy, parturition and lactation.

LABORATORY SESSIONS:

Session 1:

- Count of erythrocytes and leukocytes

- Leucocyte formula

- Determination of hemoglobin and hematocrit value

Session 2:

- Physiology of skeletal muscle

- Reflexes/ Neuronal

Session 3:

- The electrocardiogram (EKG)

- Blood pressure and pulse measurement

Session 4:

- Urine analysis

- Determination of blood glucose

Session 5:

- Spirometry

- Handling of experimental animals

- Study of vaginal smear of rats

Session 6:

- Integration: Physiology of exercise

5.4.Planning and scheduling

Schedules of lectures and problems will coincide with the officially established and will be available at: https://ciencias.unizar.es/grado-en-biotecnologia .

The places, calendar and groups for training and practical sessions will be established in coordination with the rest of subjects at the beginning of the course. The Coordinator will produce the groups of students for these activities at the beginning of course to avoid overlaps with other subjects.

The practices will be carried out in the laboratory of practices of Physiology of the Faculty of Veterinary (C/ Miguel Servet, 177) located at the main building or in the unit of Physiology of the Faculty of Medicine (C/ Domingo Miral s/n), first floor of the building A. 

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Students will be informed about any modification of the schedule through the Bulletin Board of the Course, located at the Faculty of Sciences. The same information will be placed in the ADD.

5.5.Bibliography and recomended resources