Asignatura: Physiological basis of therapeutics
Código: 31666
Centro: Facultad de Medicina
Titulación: Máster en Investigación Farmacológica
Nivel: Máster
Tipo: Compulsory
Nº de créditos: 4 ECTS
Curso académico: 2017-18

1 COURSE TITLE

Physiological basis of therapeutics

1.1. Course number

31666

1.2. Content area

Human physiology

1.3. Course type

Compulsory subject

1.4. Course level

Master Degree (posgraduate training)

1.5. Year

1st

1.6. Semester

First

1.7. Imparting language

English

1.8. Prerequisites

General requirements of the master

1.9. Minimum attendance requirement

Mnimum assistance 80% (theoretical and practical clases)

1.10. Faculty data

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Contact hours: Previous e-mail appointment is required

1.11. Course objectives

JUSTIFICATION:

Human Physiology deals with the study of the functions of human body in all its aspects: physical and chemical processes in cells, tissues, organs and systems and the organism as a whole. Physiology studies regular body function and explains how human being carries out his/her vital functions. Throughout the course the student will learn the cellular basis and function of the various systems as well as their integration and regulation for the organism to adapt to different situations.

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PROGRAM PURPOSE:

Describing and understanding the functions of systems of the healthy human organism in all his organization levels, and the integration processes that result to homeostasis. Cell physiology, physiology of the blood and the nervous, cardiovascular and renal, respiratory, digestive and endocrine systems will be studied. Thus, the basis for the proper understanding of the mechanism of action of the different groups of drugs will be settled.

SKILLS TO DEVELOP

CB6 Owning and understanding the knowledges that will provide a base or opportunity to be original in the development and/or application of ideas, often in a context of research

CB8 The students will be able to integrate knowledge and deal with the complexity of formulating judgments from information that is incomplete or limited, including reflections on the social and ethical responsibilities linked to the application of their skills and judgments

CB10 The students will have learning skills which allow them to continue studying in a way that will be largely self-directed or autonomous.

GE1 Acquiring the knowledge, abilities and skills needed to carry out an innovative quality research in Pharmacology.

ES-1. Knowing the physiological basis of Pharmacology, the main pharmacological groups and the main therapeutic targets known and potential: receptors, transporters, proteins, genes, and others, which will serve as the starting point in the research and drug development.

ES-2 Learning about the potential of new biological, gene and cell therapies

LEARNING OUTCOMES:

1. Explaining the function of organs and body systems.
2. Relating the functions of the various systems, equipment and bodies that make up the human body.
3. Interpreting the normal values indicative of correct functionality, compatible with the State of health in different organs, devices, or systems of the human body.
4. Explaining the relationships that exist among the different substances that integrate human organism.

1.12. Course contents

The course is divided into the following thematic blocks:

- **Cellular physiology**
- **Blood and immune system physiology**

- **Cardiovascular Physiology**
- **Respiratory physiology**
- **Renal physiology**
- **Digestive system physiology**
- **Endocrine system physiology**
- **Nervous system physiology**

Structured as follows:

I. CELLULAR PHYSIOLOGY

1. Homeostasis. Transport through membrane.
2. Intercellular comunication
3. Resting membrane potential
4. Action potential
5. Synaptic transmission
6. Muscle contraction

II. NERVOUS SYSTEM PHYSIOLOGY

7. General organization of the nervous system. Autonomic nervous system
8. Motor nervous system (Control of posture and movement)
9. Somatosensory sensitivity
10. Special sensitivity
11. Superior functions

III. BLOOD AND IMMUNE SYSTEM PHYSIOLOGY

12. Blood. Hematopoiesis
13. Erythrocytes
14. Hemostasis
15. Innate immunity
16. Adquired immunity

IV. CARDIOVASCULAR PHYSIOLOGY

17. Cardiac electric activity
18. Cardiac mechanics
19. Cardiac function
20. Systemic circulation
21. Cardiac output. Venous return
22. Capilar circulation
23. Circulation regulation

Seminar
S-1: Blood pressure regulation

V. RESPIRATORY PHYSIOLOGY

24. Respiratory mechanics
25. Elastic properties of respiratory system
26. Pulmonary ventilation and perfusion
27. Exchange and transport of gases

Seminar
S-2: Respiratory regulation

VI. RENAL PHYSIOLOGY

28. Renal function. Glomerular filtration and its regulation
29. Plasmatic depuration. Renal blood flow and its regulation.
30. Reabsorption and tubular secretion. Bidirectional transport.
31. Volume and osmolality control of extracellular fluid
32. Renal control of extracellular fluid pH.

Seminar
S-3: Renal function

VII. DIGESTIVE SYSTEM PHYSIOLOGY

33. Introduction to digestive function. Gastric motility.
34. Gastric secretions. Protein and carbohidrate digestion.
35. Lipid digestión. Small and large intestine.
36. Liver function.

VIII. ENDOCRINE SYSTEM PHYSIOLOGY

37. Hypothalamus- hypophysis axis
38. Thyroid hormones
39. Regulation of calcium metabolism
40. Endocrine pancreas
41. Suprarrenal gland
42. Sex hormones

Seminars
S-4: Body temperature regulation
S-5: Intake and weight regulation

1.13. Course bibliography

- Best & Taylor, "Bases Fisiológicas de la Práctica Médica", 14ª edición. Panamericana, 2010.
- Constanzo, Linda S. Fisiología. 4ª Ed. Elsevier Saunders, 2011.
- Fox, "Fisiología Humana", 10ª edición. McGraw Hill, 2008.
- Guyton & Hall, "Tratado de Fisiología Médica", 11ª edición. Elsevier Saunders, 2006.
- Mulroney, Susan E. y Myers, Adam K. Netter. Fundamentos de Fisiología. Elsevier –Masson, 2011.
- Pocock & Richards, "Fisiología Humana. La base de la Medicina", 2ª edición. Masson, 2005.
- Silverthorn, "Fisiología Humana. Un enfoque integrado", 4ª edición, 2008.
- Thibodeau-Patton, "Anatomía y Fisiología", 6ª edición. Elsevier Mosby, 2007.
- Tórtora & Derrickson, "Principios de Anatomía y Fisiología", 11ª edición. Oxford University Press, 2006.
- Tresguerres, JAF y col., "Fisiología Humana" 4ª ed.McGraw-Hill, 2010
- West, JB "Fisiología respiratoria" 8ª ed. Lippincott Williams & Wilkins, 2009.

2. Teaching methodology

1. **Lectures.** The teacher will expose the theoretical fundamentals of each topic. Audiovisual material will be used.

2. **Seminars.** Special sessions on issues on the theoretical classes, assigned tasks to the student or filing problems in which the student will relate and integrate the knowledge gained in this course.

3. Student workload

TOTAL HOURS OF PHYSIOLOGICAL BASIS OF THERAPEUTICS			
		Nº OF HOURS	**%**
Activities	Lectures	42	42%
	Seminars	5	5%
	Exams	3	3%
Student work	Weekly study and exam preparation	50	50%
Total work load		100	100%

4. Evaluation procedures and weight of components in the final grade

In both ordinary and extraordinary exams, both final (70%) and continuous (30%) evaluations will be taken into account.

Continuous assessment.

10%: attendance to classes and seminars (10% of the final grade)

20%: classroom exercises written in the classroom, or no face-to-face through the Moodle platform. These exercises may contain open short, test, true/false questions, problems, simulations, etc. The professor will announce previously the type and the date of each exercise.

Final exam

Multiple choice questions with 5 options, being valid one or two. If the question is answered correctly, 1 point will be added. If the answer is incorrect the question value is zero. In the questions with two possible answers, if only one of the options is answered, 0.5 points will be added. There will be no negative points. The exam will be marked with 5 points out of 10 when the sum of 60% of the possible points on the test. The exam will be marked with a zero when 20% of the possible points were obtained, since there are no negative points and this score can be obtained by chance.

Final grade.
The final grade in the regular evaluation will result from pondering 30% obtained in the continuous evaluation grade and 70% of the grade of the final exam. The extraordinary evaluation shall be in the same way, keeping the note of the continuous assessment obtained during the course.
In both evaluations, the final grade must be equal to or greater than 5 points out of 10 and have obtained at least 4.5 points out of 10 in the final exam.
If a student does not show up to any of the continuous evaluation test, will be qualified with a zero.
Students who do not perform the final examination or who has not participated, at least in 50% of the scheduled activities will be considered "not evaluable" both in the ordinary into the extraordinary evaluations.

5. Course calendar

Week	Contents	Contact hours	Independent study time
4	CELLULAR PHYSIOLOGY	6	6
5	NERVOUS SYSTEM PHYSIOLOGY	5	5
5	BLOOD AND IMMUNE SYSTEM PHYSIOLOGY	5	5
6	CARDIOVASCULAR PHYSIOLOGY	8	8
6-7	RESPIRATORY SYSTEM PHYSIOLOGY	5	5
7-8	RENAL PHYSIOLOGY	6	6
8	DIGESTIVE PHYSIOLOGY	4	4
9-10	ENDOCRINE SYSTEM PHYSIOLOGY	8	8
12	FINAL EXAM	3	3

* This course calendar is orientative