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**1. DESCRIPCIÓN DE LA ASIGNATURA/Subject description**

<b>Grado/Degree:</b>	<b>Ciencias de la Actividad Física y del Deporte</b>
<b>Doble Grado:</b>	
<b>Asignatura/Subject:</b>	<b>Human Physiology</b>
<b>Módulo/Module:</b>	<b>Módulo I. Fundamentos Científicos de la Motricidad Humana</b>
<b>Departamento/Department:</b>	<b>Physiology, Anatomy and Cellular Biology</b>
<b>Año académico/Academic year:</b>	<b>2014/2015</b>
<b>Semestre/Semester:</b>	<b>First Semester</b>
<b>Créditos totales/Number of credits:</b>	<b>4.5</b>
<b>Curso/Course:</b>	<b>1º</b>
<b>Carácter/character:</b>	<b>Obligatory</b>
<b>Lengua de impartición/language:</b>	<b>English</b>

<b>Modelo de docencia:</b>	<b>C1</b>	
<b>a. Enseñanzas Básicas (EB)/Lectures:</b>		<b>50%</b>
<b>b. Enseñanzas de Prácticas y Desarrollo (EPD)/Practical:</b>		<b>50%</b>
<b>c. Actividades Dirigidas (AD):</b>		

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**2. RESPONSABLE DE LA ASIGNATURA/Person in charge of the subject**

<b>Responsable de la asignatura/Responsible of the subject</b>	
<b>Nombre/Name:</b>	<b>ANTONIO RODRÍGUEZ MORENO</b>
<b>Centro/Centre:</b>	<b>Faculty of Sports</b>
<b>Departamento/Department:</b>	<b>Physiology, Anatomy and Cellular Biology</b>
<b>Área/Area:</b>	<b>Physiology</b>
<b>Categoría/Position:</b>	<b>Profesor Titular de Universidad</b>
<b>Horario de tutorías/Tutorials:</b>	<b>Mondays, Tuesdays and Fridays 13:00-15:00 h</b>
<b>Número de despacho/office:</b>	<b>22-1-06</b>
<b>E-mail:</b>	<b>arodmor@upo.es</b>
<b>Teléfono/phone:</b>	<b>954977393</b>

Profesores/other teachers:

<b>Nombre/Name:</b>	
<b>Centro/Centre:</b>	
<b>Departamento/Department:</b>	
<b>Área/Area:</b>	
<b>Categoría/Position:</b>	

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<b>Horario de tutorías/tutorials:</b>	
<b>Número de despacho/office:</b>	
<b>E-mail:</b>	
<b>Teléfono/Phone:</b>	

### 3. UBICACIÓN EN EL PLAN FORMATIVO/Formative plan

#### 3.1. Objectives

This subject, together with Anatomy, Biochemistry and Psychology are key to understand the basis of the functioning of the healthy human body and his essential vital processes. This knowledge will also be applied to sport practise and human body movement. This subject is crucial to understand the fundamentals of human body movements and his control and will constitute the basis for the study of other subjects in the career as Biomechanic.

The general objective of Human Physiology subject is to make the students of “Grado en Ciencias de la Actividad Física y del Deporte” to understand the physiological mechanisms underlying physical activity and the regulation of vital human body functions. At the end of the course, the students should know the physiological basis of the functioning of the different systems that constitute the human body and the basis of their integrated functioning.

#### OBJECTIVES.

1. To acquire general knowledge of the human body physiology.
2. To study locomotor, circulatory, respiratory, renal, digestive, endocrine and nervous systems.
3. Students should be able to apply this knowledge to particular situations related to their future work.

#### 3.2. Addition to the formative plan

The subject is crucial to understand how the human body works under normal circumstances. Together with the Anatomy subject, describe the parts that compose the organism. Physiology indicates how these parts work both isolated and as part of a



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whole. Both subjects are studied during the first year of the career to help the students to quickly acquire this knowledge of the human body. In summary, Human Physiology gives the conceptual and cognoscitive frame to understand the functioning of the body and his relationship to motility. It is also fundamental to acquire some of the necessary skills to properly develop future work.

### **3.3. Previous knowledge**

This subject is recommended for students that already have basic knowledge of biochemistry and cellular biology.

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#### 4. COMPETENCIAS/Skills

##### 4.1. Skills related to Qualification

1. To understand and to have basic knowledge, related to Sciences of Physical Activity and Sports.
2. To know, understand and apply the object of study of Sciences of Physical Activity and Sports.
3. To acquire and to apply the basic knowledge on different situations.
4. To understand and to apply the scientific literature.
5. To be able to develop and to potentiate a collaborative and proactive attitude in students.

##### 4.2. Skills related to the Module

1. To understand and to have basic knowledge, related to Sciences of Physical Activity and Sports.
2. To know, understand and apply the object of study of Sciences of Physical Activity and Sports.
3. To acquire and to apply the basic knowledge on different situations
4. To know, understand and apply the effects of physical exercise practise on structure and function of the human body.
5. To understand and apply the scientific literature.

##### 4.3. Skills related to the subject

1. Generic:

To understand and have basic knowledge related to human body physiology.

Learning results expected from students:

1.1. To analyze human being as a biological whole and use the correct nomenclature related to Human Physiology.

1.2. To acquire basic knowledge and apply the physiological principles to different fields of physical activity and sport.

1.3. To understand and apply the effects of sport on human body physiology.

2. Cognitives (to know): Skills applying knowledge. Specifically it is expected that students will be able to:



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- 2.1. To know and interpret the input and output pathways related to sensory information.
2. 2. To describe the muscle physiology at cellular level.
2. 3. To know different types of reflex involving spinal cord and other central structures.
- 2.4. To know and interpret normal physiology of different systems (nervous, circulatory, respiratory, renal, digestive, endocrine) and to be able to correctly interpret the changes in those structures after physical activity.

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**5. CONTENIDOS DE LA ASIGNATURA (TEMARIO)/Content**

I. INTRODUCTION

1. Introduction to Human Physiology. Cellular membranes and transmembrane transport.
2. Excitable cells. Cell communication.
3. General physiology of sensory receptors and effector's systems.

II. NERVOUS SYSTEM

4. Introduction to the study of the nervous system. Somesthesia.
5. Vestibular receptors.
6. Motor functions of the nervous system: spinal cord, brain stem, cerebral cortex, basal ganglia and cerebellum.
7. Autonomous nervous system

III. CIRCULATORY SYSTEM

8. General physiology of the cardiac function. Electrical activity of the heart. The cardiac pump. Regulation of cardiac activity.
9. Principles of hemodynamic.

IV. RESPIRATORY SYSTEM

10. Respiratory system. Gas exchange. Gas transport. Regulation of respiration.

V. RENAL SYSTEM

11. Basic principles of renal physiology. Urine formation.

VI. NUTRITION AND DIGESTION

12. The digestive system.

VII. ENDOCRINE SYSTEM

13. Introduction to the study of endocrine systems.
14. The hypophysis.
15. Suprarenal glands.

PRACTICAL WORK (LAB)

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1. Simulation and analysis of action potentials.
2. Perception in humans
3. Biopotential recordings. EEG. ECG.
4. Cardiovascular effects of exercise.
5. Blood and osmosis.
6. Digestive physiology
7. Hormone actions.

**PERSONAL ASSIGNMENTS:**

1. Selectivity of biological membranes and ionic permeability.
2. Isotonic drinks.
3. Action potentials propagation in different parts of the organism.
4. Physiological effects of legal and illegal substances taken by sportspersons.
5. Physiology of neuro-muscular synaptic transmission.
6. The importance of touch in sportspersons.
7. The control of equilibrium in sportspersons.
8. Fonorreceptors and sports.
9. Is olfaction important for sports practise?
10. Spinal reflexes.
11. Brainstem and motor control.
12. Neocortex role in the control of voluntary movements.
13. Cerebellum and motor coordination.
14. Biological rhythms. Which is the best moment of the day to practise sport?
15. Learning and sport. Cerebral structures involved.
16. Characteristics of ECG in sportspersons.
17. Blood circulation and muscle physiology.



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18. Characteristics of respiration in sportspersons.
19. Characteristics of energetic metabolism in sportspersons.
20. Hormones and sports.

## **6. METODOLOGÍA Y RECURSOS/Methodology**

Theoretical classes will consist in Lectures.

The students will present a work using Power Point.

The students will be able to contact to the teacher by using email tutorials.

There will be 7 lab practicals.

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## 7. EVALUACIÓN/GRADING

All activities will be taken into account for grading (continuous evaluation).

There will be 1 exam consisting in 60 multichoice questions + 4 short questions to develop.

Lab: In each lab practical the students will be asked to reply to different questions.

Assignments: All students have to prepare PPT presentation related to a concrete part of the subject.

### WEIGHT:

- 1.- Exam. 60 %.
- 2.- LAB. 20 %.
- 3.- Participation in classes. 10 %.
- 4.- Assignments. 10%.

Students involved in movility programs, high level sport practise, working or with serious health problems (clearly justified and communicated to the teacher before the end of the course) that did not made the continuous evaluation will be evaluated by one examination consisting in: One exam (multichoice + short questions, 70%), an assignment (10%) and one oral exam of practical knowledge (20%).

### Second evaluation:

The student that does not pass the first evaluation will be evaluated in the named "Convocatoria de recuperación de curso". Students that passed some of the partial test performed during the course will keep the grades obtained and will be examined only of the parts not passed. This test will consist on: One exam (multichoice + short questions, 70%), an assignment (10%) and one oral exam of practical knowledge (20%).



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## 8. BIBLIOGRAFÍA GENERAL/Bibliography

Fox, S. I. (2011). Human Physiology. McGraw-Hill/Interamericana.

Kandel, E.R., Schwartz, J.H. y Jessell, T.M. (2000). Principles of Neural Science  
Madrid: McGraw-Hill/Interamericana.

Shier, Butler, Lewis. Hole's. Human Anatomy and Physiology (2010). 12<sup>th</sup> Edition, ,  
McGraw Hill.