

## HUMAN AND CELL PHYSIOLOGY

MODULE	CONTENT	YEAR	TERM	CREDITS	TYPE
BASIC COMMON KNOWLEDGE	HUMAN AND CELL PHYSIOLOGY	1 <sup>st</sup>	2 <sup>nd</sup>	6 ECTS	Obligatory
<b>LECTURER</b>			<b>CONTACT INFORMATION</b>		
<ul style="list-style-type: none"> <li>Javier Diaz Castro</li> </ul>			Department of Physiology, 1 <sup>st</sup> Floor, Faculty of Pharmacy, Phone number: +34 958 243884, Office 151. E-mail: <a href="mailto:javierdc@ugr.es">javierdc@ugr.es</a> Website: <a href="http://www.ugr.es/local/javierdc">http://www.ugr.es/local/javierdc</a>		
<b>DEGREE WITHIN THE SUBJECT IS TAUGHT</b>			<b>TUTORING AND MEETINGS</b>		
Degree in Food Science and Technology			First semester: M, W and F 16.00-18.00 Second semester: T, 15.00-16.00, W 16.00-17.00 and 18.00-19.00, Th 17.00-18.00 and F 16.00-17.00 and 18.00-19.00 The lecturer will also answer questions via the SWAD teaching platform.		
<b>PREREQUISITES and/or RECOMMENDATIONS</b>					
<p><b>Prerequisites:</b> those necessary to access to the degree, related with the level of formation that the student must acquire to accede to the University.</p> <p><b>Recommendations:</b> to have previous basic knowledge (background knowledge of Chemistry, Anatomy and Histology, Biochemistry, Metabolism. A good standard of English and informatics skills are also required.</p>					
<b>BRIEF ACCOUNT OF THE SUBJECT PROGRAMME</b>					
<p>The programme has a high degree of <b>coherence and integration</b> and cover a diverse range of topics, while reflecting particular strengths within the biological and life sciences and there is a clear coherence between the different modules. Physiology is a study of the normal functions of cells, organs and systems of the living body, the mechanisms by which they are achieved and the regulation of functional activities to maintain the homeostasis, therefore <b>the programme has been divided into thematic units just for didactic purposes</b>, but during the course we will integrate all the body systems defining their links to maintain the homeostasis.</p>					
<b>GENERAL AND PARTICULAR ABILITIES</b>					
<p>Physiology is a study of the normal functions of cells, organs and systems of the living body, the mechanisms by which they are achieved and the <b>regulation of functional activities</b>. A firm grasp of its principles is essential not only for the study of successive courses, but also for students' future professional career after graduation. Selection of the teaching material will be in accordance with the necessity of professional education and will be laid emphasis on basic theories and knowledge of physiology as well as on the training of basic techniques. <b>Attention will also be paid to promote the ability of scientific thinking</b> of the students. In order to foster the students' ability of studying physiology, we conduct our teaching with several methods, such as self-study, exhibition in small groups and tutoring instead of to be given only by lecturer in the classroom. The lifelong learning to obtain more and better competences requires new pedagogical practices and the emergence of new scenarios for the students in where <b>multimedia shall play a predominant role</b> in our</p>					



programme. Therefore, multimedia resources will be using our methodological teaching-learning process in the classroom. **Cooperative learning networks will be built and innovative teaching-learning strategies will be used to complement the traditional classes.**

## OBJECTIVES (EXPRESSED IN TERMS OF EXPECTED RESULTS OF THE TEACHING PROGRAMME)

### Cognitive objectives:

- Understand and analyze the interactions between nervous system, cellular communication and its relation to human homeostasis.
- Study, understand and analyze the physiological roles of all the body systems and its integration to maintain homeostasis.

### Procedural aims:

- Know properly use terms and concepts of matter and expressed in a correct and accurate.
- Deduct, identify and describe the physiological effects of body systems to maintain a stable, constant condition in the human body.
- Deduct, interpret and evaluate critically experimental results.
- Know the main documentary sources of the discipline of developing the ability to complete and update knowledge in the future.

### Attitudinal objectives:

- Determine the complex interactions to maintain balance or return systems to functioning within a normal range.
- A scientific approach to the study and explanation of physiological phenomena in the domain of scientific knowledge.

## DETAILED SUBJECT TOPICS

We will use **several multimedia instruments during the course** to enhance the teaching-learning process of the student. This programme has been designed taking into account the integration concept and **cover a diverse range of physiological topics, with a clear coherence between the different modules**. Physiology is a study of the normal functions of cells, organs and systems of the living body, the mechanisms by which they are achieved and the regulation of functional activities to maintain the homeostasis, therefore the programme has been divided into thematic unit just for didactic purposes, although during the course we will integrate all the body systems, to understand better how they maintain a stable, constant condition.

### THEMATIC UNIT I: INTRODUCTION AND CELL PHYSIOLOGY

Module 1: Introduction to Physiology. Concept and homeostasis. (0.5)

Module 2: Cell functioning. Cell membrane. Transport towards cell membrane. (1h)

### THEMATIC UNIT II. NERVOUS SYSTEM

Module 3: Resting membrane potential and action potential. Excitability. (1.5h)

Module 4: Nervous cells. Synaptic transmission. (1h)

Module 5: Organization of the nervous system. (1h)

Module 6: Physiology of sensory organs. (3h)

Module 7: Motor control. (0.5h)

Module 8 Nervous autonomic system. (2h)

Module 9: Superior functions of the nervous system. (0.5h)

Module 10: Skeletal and visceral muscle physiology. (2h)

### THEMATIC UNIT III. BODY FLUIDS AND BLOOD

Module 11: Body Fluids. Blood. (1h)

Module 12: Blood cells. Haematopoiesis (2h)

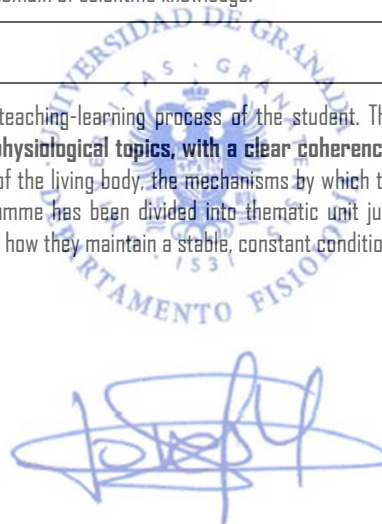
Module 13: Hemostasis and coagulation. (0.5h)

### THEMATIC UNIT IV. ENDOCRINE SYSTEM

Module 14: Neuroendocrine integration. (1.5h)

Module 15: Thyroid gland physiology. (1h)

Module 16: Endocrine regulation of growth and proteic metabolism. (1h)



Module 17: Endocrine regulation of glucidic and lipid metabolism. (1.5h)  
Module 18: Endocrine regulation of ionic/salt and water balance. (0.5h)  
Module 19: Endocrine regulation of calcium and phosphorus metabolism. (1h)

#### THEMATIC UNIT V. CARDIOVASCULAR SYSTEM

Module 20: The heart. Electrocardiography. (1h)  
Module 21: Cardiac cycle and cardiac output. (1.5h)  
Module 22: General circulation and microcirculation. (1h)  
Module 23: Cardiovascular regulations. (1.5h)

#### THEMATIC UNIT VI. RESPIRATORY SYSTEM

Module 24: Morphologic and functional structure of the respiratory system. Ventilation. (0.5h)  
Module 25: Transport and exchange of respiratory gases. (0.75h)  
Module 26: Nervous and chemical control of the respiratory process. (0.75h)

#### THEMATIC UNIT VII. RENAL SYSTEM

Module 27: Morphologic and functional structure of the renal system. (1h)  
Module 28: Urine formation, concentration and dilution. (0.5h)  
Module 29: Regulation of the acid-base balance. (0.5)

#### THEMATIC UNIT VIII. DIGESTIVE SYSTEM

Module 30: Morphologic and functional structure of the digestive system. Motility. (1h)  
Module 31: Digestive secretions. Nutrient metabolism (2.5h)  
Module 32: Digestion and absorption. (1.5h)

#### THEMATIC UNIT IX. REPRODUCTIVE FUNCTION

Module 33: Morphologic and functional structure of the reproductive system. (1.5h)  
Module 34: Fecundation, childbirth and breastfeeding. (0.5h)

#### THEMATIC UNIT X. INTEGRATION

Module 35: General adaptation syndrome. (1h)



### SYSTEM FOR ASSESSING THE ACQUISITION OF THE COMPETENCES AND KNOWLEDGE

#### I. Continuous assessment during the course

This method is voluntary. The students who want to improve their final evaluation shall perform all activities proposed by the lecturer during the course as well as participate actively in them. To be voluntary, this assessment is characterized by:

-The lecturer will not evaluate a student who is not properly involved in the proposed activities.

-The methodological work will be carried out according to schedule:

- Exhibition in class
- Questions answered correctly in class
- Attendance to theoretical classes and seminars (group preparation of readings, essays, problem solving, seminars) to be presented or submitted in theoretical lectures, practical and/or small-group tutoring sessions.

#### II. Final evaluation

Includes two partial and one final exam required by law. They will be conducted in three sessions during the course. In any of them, this test will have different values depending on the student has participated or not in the progressive assessment. For those students who have participated on continuous assessment,



final exam will account only 70% of final grade.

The remaining 30% will come from the instruments continuous assessment done during the course: attendance to theoretical classes, exhibitions in class, meetings and final evaluation of practical laboratory classes. If the student does not participate in all the continuous assessment, the final exam will be worth also 70%, therefore the maximum qualification that a student will get will be a 7/10.

## BIBLIOGRAPHY

### Print Books on Physiology

- Anatomy & physiology / *Gary A. Thibodeau, Kevin T. Patton. REF QP34.5 .S4 2003*
- Appleton & Lange review of physiology / *David G. Penney. QP40 .P44 2004*
- Color atlas of physiology / *Agamemnon Despapoulos. REF QP34.5 .S5313 2003*
- Human physiology / *Stuart Ira Fox. REF QP34.5 .F68 2004*
- Human physiology: from cells to systems / *Lauralee Sherwood. REF QP34.5 .S48 2004*
- Introduction to the human body : the essentials of anatomy and physiology / *Gerard J. Tortora, Sandra Reynolds Grabowski. QP36 .T67 2004*
- Physiology / *[edited by] Robert M. Berne [et al.]. REF QP34.5 .P496 2004*
- Principles of anatomy and physiology / *Gerard J. Tortora, Sandra Reynolds Grabowski. REF QP34.5 .T67 2003*

### Print Journals

- American Journal of Physiology.
- Canadian Journal of Applied Physiology.
- European Journal of Applied Physiology.
- Annual Review of Physiology.
- Handbook of Physiology.
- News in Physiological Reviews.



## RECOMMENDED INTERNET LINKS



## Electronic Books

- [Cardiovascular Physiology](#)/ Hans-Joachim Priebe and Karl Skarvan, 2000. (netLibrary)
- [Origination of Organismal Form: Beyond the Gene in Developmental and Evolutionary Biology](#)/ Vienna Series in Theoretical Biology, 2003.
- [Purkinje's Vision: The Dawning of Neuroscience](#)/ Nicholas Wade, Josef Brozek, JirA Hoskovek, 2001. (netLibrary)

## Electronic Journals

- [Advances in Physiology Education](#) (DDAJ)
- [American Journal of Physiology](#) (EBSCO Open Access)
- [BMC Physiology](#) (DDAJ)
- [Experimental Physiology \(Cambridge\)](#) (EBSCO Open Access)
- [Journal of Applied Physiology](#) (Free Medical Journals)
- [Nephron - Physiology](#) (Academic Search Premier)
- [Journal of Physiology](#) (Free Medical Journals)
- [The Journal of General Physiology](#) (Free Medical Journal)

## PRACTICAL LABORATORY CLASSES

Group work sessions in the laboratory supervised by the lecturer. Meaningful construction of knowledge through interaction and student activity. The practical classes at the laboratory will be taught as follows:

- Practical Session 1.** Physical and chemical aspects of the digestive process (1.5h)
- Practical Session 2.** Blood cell count and morphology by mean of the optical microscope (3h)
- Practical Session 3.** Respiratory system assessment by mean of spirometry (1.5h)
- Practical Session 4.** Blood Pressure assessment completed with a software simulation. (1.5h)
- Practical Session 5.** Glucemic profile (1.5h)
- Practical Session 6.** Gastrointestinal perfusion *in viva* study. (3h)

## TUTORING

Personalized and small group attention. **Continuous instruction and/or orientation carried out by the lecturer** for the purpose of reviewing and discussing the materials and topics presented in lectures, seminars, readings, writing papers and of course to answer questions related with the subject.

## ADDITIONAL COMMENTS

This programme offers a sound introduction to understanding the mechanisms that underlie normal tissue function, at the molecular, cellular and whole human levels. The current guide lists sources of information for the subject "Human and Cell Physiology". It is not inclusive, but is meant to provide a starting place when you are looking for information. All the lectures will be taught in Spanish, however the lecturer has a good standard of English and **all the comments/questions and meetings with the lecturer can be made and answered in English**. The **exams also can be made in English**. For additional information, please talk directly with the lecturer.

In addition, the Department of Physiology offers a complete undergraduate degree programme in Physiology. At postgraduate level, we offer a suite of leading programmes in Human & Applied Physiology and Human Nutrition (all of them with quality/excellence mentions).

