

**Animal Physiology: Systems**

Code: 100993  
ECTS Credits: 6

Degree	Type	Year	Semester
2500502 Microbiology	OT	4	0

The proposed teaching and assessment methodology that appear in the guide may be subject to changes as a result of the restrictions to face-to-face class attendance imposed by the health authorities.

**Contact**

Name: Mercè Giralt Carbonell  
Email: Merce.Giralt@uab.cat

**Use of Languages**

Principal working language: catalan (cat)  
Some groups entirely in English: No  
Some groups entirely in Catalan: Yes  
Some groups entirely in Spanish: No

**Prerequisites**

It is advisable that the student has attained basic skills and knowledge on the structure and organization of animals.  
It is important that the student has acquired the basic skills and knowledge of animal physiology.

**Objectives and Contextualisation**

The general objectives of the course are:

- Learn the basics of physiology of different functional systems of the organism.
- Acquire a comprehensive and integrated interrelationships of the various systems.
- Integrate the knowledge of the physiology acquired in other core subjects.
- To train students to apply knowledge in physiological deduction of the organism.

## Competences

- Display a capacity for analysis, synthesis, organisation, planning and decision-making.
- Recognise the different levels of organization of living beings, especially animals and plants, diversity and bases of regulation of vital functions of organisms and identify mechanisms of adaptation to the environment.
- Work individually or in groups, in multidisciplinary teams and in an international context.

## Learning Outcomes

1. Analyse the functional mechanisms of hydrosaline and acid-base equilibrium in the animal organism.
2. Display a capacity for analysis, synthesis, organisation, planning and decision-making.
3. Identify the macroscopic and microscopic structure of the nervous system and relate this to its functioning.
4. Understand and interpret the functions and regulation mechanisms of animal systems.
5. Work individually or in groups, in multidisciplinary teams and in an international context.

## Content

The program to be followed will be as follows, unless the requirements enforced by the health authorities demand a prioritization or reduction of these contents.

### SCHEDULE OF THE COURSE

1

-Introduction to Animal Physiology:

- Basic principles of physiology. Internal environment and homeostasis. Feedback mechanisms (feedback).

Compartments liquid composition. Transport through the membrane. Communication intercellular.

2.

Excitability and excitable cells:

- Concept and excitability excitable cells.
- The nervous system: neurons and glia
- Electrical activity in neurons: ion channels. Ionic basis of resting membrane potential and action potentials. Nerv
- Synapse. Basics of Neurochemistry. Neurotransmission.
- Synaptic integration.

3.-

Type of muscle tissues: anatomical and functional characteristics.

- Striated skeletal muscle
- Cardiac muscle
- Visceral smooth muscle

4.

Nervous System

- Anatomical organization of the nervous system. Development of the nervous system
- Protective Structures of the nervous system: bone structure. Meninges. Cerebrospinal fluid.

BHE.

- Structural central nervous system: cerebral hemispheres: histological structure of the cerebral cortex.

Functional organization of the cortex. Basal ganglia. Hippocampus. Amygdala.

- Functional organization of structures diencephalic, mesencephalic and brainstem.
- Spinal cord

5. Sensory Physiology:

- Sensory receptors. Concept. Type. Transduction mechanisms.

- Somatosensory receptors. Touch and pressure. Thermoreceptors. Nociception. Pathways processing somatose
- Special Senses. Chemoreception: smell and taste.
- Photoreception: the human eye
- Hearing and equilibrium: human ear.

## 6. The autonomic nervous system

- Sympathetic and parasympathetic

## 7. Somatic motor system

- Organization cord. Muscle organs and spinal reflexes.
- Organization supramedullary. The role of the cerebral cortex, cerebellum and basal ganglia

## 8. Activation SNC:

- Reticular system. Wakefulness and sleep. Electroencephalogram.

## 9. Circulatory System:

- Elements of blood forms. Hemostasis.
- Concepts of hemodynamics. Functional organization of the circulatory system.
- Functional structure of the heart, electrical and mechanical events during the cardiac cycle. Electrocardiogram.
- Arterial, venous. Blood pressure. Capillary exchange.
- Control of the cardiovascular system.
- Lymphatic System

## 10. Respiratory Physiology:

- Functional anatomy of the respiratory system. The lungs of mammals. Functional structure. Exchange gases.

- Regulation of respiration in mammals.

#### 11. Renal Physiology:

- The mammalian kidney. Functional anatomy. Processes involved in the formation of urine. Formation of urine c

#### 12. Digestive:

- Anatomy and function of the digestive system in mammals. Gastrointestinal regulatory systems: enteric nervous

- Mouth and esophagus: saliva and swallowing

- Stomach

- Small intestine: Pancreatic Secretion. Bile secretion. Chemical digestion. Absorption. Entero-hepatic circulation

- Large intestine: digestion mechanical and chemical. Absorption. Formation of feces. Defecation

#### 13. Control of body temperature

#### 14. Endocrine system

- Hormones. Mechanisms of action. Regulatory systems.

- The pituitary: Neurohypophysis. Neurohypophysis hormones. Adenohypophysis. Adenohypophysis hormones. (

- Adrenal Glands: adrenocortical tissue: Glucocorticoids. Mineralocorticoid. Chromaffin tissue: Catecholamines

- The thyroid gland. Synthesis and function of thyroid hormones.

- Pancreatic hormones. Insulin and glucagon.

- The metabolism of calcium and phosphorus. Parathyroid hormone, vitamin D and calcitonin

## 15. Reproduction:

- Testicular function. Control of male reproductive functions
- The ovarian function. The endometrial and ovarian cycle. Player control in the female.

## Methodology

### Methodology

#### Theoretical lectures:

Traditional lectures on the contents of the theoretical program imparted by the professor with the support of images obtained mainly from the bibliography that is recommended to the student.

#### Seminars:

The student works in small groups.

1.-SEMINARS OF CASES AND PROBLEMS (3 hours): discussion and resolution of practical cases and problems

2.-SEMINARS OF THEMES (3 + 3 hours): Students prepare a topic chosen by them, from the list of topics proposed by the teacher. The students will present a written summary (maximum 2 sheets) and at the end, an oral presentation (maximum 15 minutes).

All the students of the group must participate in the written and oral presentation.

The proposed teaching methodology may experience some modification depending on the restrictions to face-to-face activities enforced by the health authorities.

## Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Theoretical lectures	39	1.56	1, 4, 3, 2
seminars	6	0.24	1, 4, 3, 5, 2
Type: Supervised			
preparation of seminars	6	0.24	1, 4, 3, 5, 2
Type: Autonomous			
preparation of works	19	0.76	1, 4, 3, 5, 2
study	66	2.64	1, 4, 3, 5, 2

## Assessment

## Evaluation

According to current regulations, the continuous evaluation process must include a minimum of three evaluation activities, of two different types, distributed throughout the course, none of which can represent more than 50% of the final grade.

In this subject, the assessment includes 4 assessment activities: two theoretical and two seminars and 3 typologies: written tests, work assignments and oral defense of the work. Below we will detail this evaluation process.

### 1.- Evaluation of the theory: 75% of the final grade (two partial exams 35% -40%)

The theoretical knowledge will be evaluated by means of two partial exams: one half-semester and the other one at the end. The value of each partial will be between 35% - 40% approximately and always proportional to the amount of matter evaluated.

1.1.- Theoretical exams: partial: Will be multiple-choice examination, of 4 possible answers, a single correct answer.

To pass by partial the minimum mark of each partial will have to be  $\geq$  of 4.3 and the final grade of theory after making the half between the two partials (proportional according to the subject) will have to be  $\geq$  5. Otherwise, there will be to go to recovery of the first, second or two suspended partials. If both partials exceed 4.3 but do not reach 5 score, the student can choose the partial to recover.

1.2.- Theoretical test: Recovery: To participate in the recovery, the students must have been previously evaluated in a set of activities whose weight equals to a minimum of two thirds of the total qualification of the student. Therefore, students will obtain the "Non-gravable" qualification when the assessment activities carried out have a weighting of less than 67% in the final grade.

There is a recovery test for each partial suspended. The recovery exam, consists of 4 short questions to be developed and 10 true or false and reason the answer.

1.3.- Theoretical test: To improve the final grade: There is the possibility of a special exam to improve the final grade. The exam is of all theoretical course (you cannot exam of only one of the two partial) the same day of the recovery.

### 2.- Evaluation of the seminars: 25% of the final grade (problems 10% - subjects 15%)

In the seminars students work in groups (4-5) that are organized at the beginning of the course.

2.1.-Case and problem seminars. They will be two: one half-semester and the other at the end. Written tests

2.2.- Seminars of subjects: (3 + 3)

A: delivery of written report: summary of a chosen subject (5%)

B: Oral defense of the work (5%)

C: Written exam on all seminars presented in the current course (5%) with multiple-choice examination (one question per seminar)

The seminars will not be recoverable.

Student's assessment may experience some modifications depending on the restrictions to face-to-face activities enforced by the health authorities.

## **Assessment Activities**

---

Title	Weighting	Hours	ECTS	Learning Outcomes
Teoria	75%	8	0.32	1, 4, 3, 2
seminaris	25%	6	0.24	1, 4, 3, 5, 2

## Bibliography

### Fisiologia Humana i mèdica

- BERNE R. M., LEVY M.N. Fisiologia 3a ed. Harcourt 2006
- BARRETT K.E., BARMAN S.M., BOITANO S., BROOKS H.L. Ganong's Review of Medical Physiology. 23rd edition McGraw Hill. LANGE . 2010.
- FOX, S.I. Fisiología Humana. 7a ed. McGraw-Hill Interamericana 2003
- GANONG, W.F. Review of Medical Physiology 23 edition Lange Medical books/McGraw-Hill. 2005
- GUYTON, A.C. HALL, J.E.. Textbook of Medical Physiology. 11a ed. Elsevier Saunders. 2006
- MARTIN CUENCA E, Fundamentos de Fisiologia Thomson 2006
- MOYES, C.D SCHULTE, P.M. Principios de Fisiología Animal. Pearson 2007
- POCOCK,G.; RICHARDS C.D. Fisiología humana. Masson 2001.
- RHOADES R.A. BELL D.R. Medical Physiology. Principles for Clinical Medicine. 3rd edition Lippincott Williams & Wilkinns. 2009
- TORTORA, DERRICKSON, Principios de anatomia y fisiologia 11ª ed. Panamericana 2006
- TRESGUERRES,J.A.F. Fisiologia Humana. 3ª ed. Interamericana McGraw-Hill. 2005
- SILVERTHORN, Fisiologia Humana. Un enfoque integrado 4ª ed. Panamericana 2008
- VANDER, SHERMAN, LUCIANO. Fisiología Humana. McGraw-Hill 1999
- WIDMAIER E.P., RAFF H., STRANG K.T. Vanders's Human physiology. The mechanisms of body function 12 edition McGraw-Hill. 2011

### Fisiologia Animal i comparada (consulta de temes concrets)

- HILL, R.W., WYSE, [M. ANDERSON](#). Fisiologia Animal. Panamericana 2006
- RANDALL, D., W. BURGGREN, and K. FRENCH. Eckert Fisiologia Animal. Mecanismos y adaptaciones. 4ª ed. Interamericana McGraw-Hill. 1998

### Versions electròniques de llibres de Fisiologia:

Autor Jesús A. Fernández-Tresguerres ... [et al.]

Títol - Fisiología humana [Recurs electrònic]

Edició 4a ed

Publicació - México, [etc.] : McGraw-Hill Interamericana, cop. 2014

Enllaç en el catàleg de la UAB [http://catalog.uab.cat/record=b1965070~S1\\*cat](http://catalog.uab.cat/record=b1965070~S1*cat)

Autor Silverthorn, Dee Unglaub, 1948-

Títol Fisiología humana [Recurs electrònic] : un enfoque integrado / Dee Unglaub Silverthorn, con colaboración de Bruce R. Johnson y William C. Ober

Edició 6a ed.

Publicació/producció Buenos Aires [etc.] : Médica Panamericana, cop. 2014

Enllaç en el catàleg de la UAB: [http://cataleg.uab.cat/record=b1942946~S1\\*cat](http://cataleg.uab.cat/record=b1942946~S1*cat)

Títol: Ganong fisiología médica [Recurs electrònic] /Kim E. Barrett ... [et al.]

Publicació: México : McGraw-Hill Interamericana, cop. 2013

Edició: 24<sup>a</sup> ed.

Enllaç en el catàleg de la UAB <http://cataleg.uab.cat/record=b1983899>