

**Animal Physiology**

Code: 100898  
ECTS Credits: 6

Degree	Type	Year	Semester
2500252 Biochemistry	FB	2	2

**Contact**

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**Use of Languages**

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

**Prerequisites**

Basic skills and knowledge of the subjects of Biochemistry, Cell Biology and Histology

**Objectives and Contextualisation**

Learn the basics of physiology of different functional systems of the body animal and regulatory systems.

- Acquire a complete and integrated view of the interrelationships of the \
- Integrate the knowledge of the physiology acquired in other core subjec
- To train students to apply knowledge in physiological deduction of the c

## Competences

- Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
- Analyse and explain normal physiological processes and alterations in them on the molecular scale, using the scientific method.
- Be able to self-evaluate.
- Collaborate with other work colleagues.
- Combine research and the generation of knowledge with problem-solving in one's own field, showing sensibility to ethical and social questions.
- Demonstrate an integrated vision of the function of hormones, neurotransmitters and growth factors in the control of gene expression and metabolism.
- Make an oral, written and visual presentation of one's work to a professional or non-professional audience in English and understand the language and proposals of other specialists.
- Manage bibliographies and interpret the information in the main biological databases, and also know how to use basic ICT tools.
- Manage information and the organisation and planning of work.
- Read specialised texts both in English and one's own language.
- Take responsibility for one's own learning after receiving general instructions.
- Take sex- or gender-based inequalities into consideration when operating within one's own area of knowledge.
- Think in an integrated manner and approach problems from different perspectives.
- Understand the language and proposals of other specialists.
- Use ICT for communication, information searching, data processing and calculations.

## Learning Outcomes

1. Act with ethical responsibility and respect for fundamental rights and duties, diversity and democratic values.
2. Be able to self-evaluate.
3. Collaborate with other work colleagues.
4. Combine research and the generation of knowledge with problem-solving in one's own field, showing sensibility to ethical and social questions.
5. Compare the different circulatory systems in animals.
6. Contrast and describe nitrogen excretion processes in different animal species.
7. Define the systems for controlling the cardiovascular function: cardiac function, circulation and arterial blood pressure.
8. Describe the motility, secretion, digestion and absorption systems of the digestive tract.
9. Describe the processes involved in gas exchange and osmoregulation processes in animals.
10. Explain temperature-regulation processes and related adaptations and responses in animals.
11. Explain the mechanisms for controlling the reproductive function.
12. Holistically interpret physiological responses to exercise, fasting, satiety and thirst.
13. Identify and distinguish between the bases of blood function.
14. Identify the systems for controlling the volume, osmolarity and pH of body fluids.
15. Identify the systems for endocrine control of the thyroid, pancreatic and adrenal functions and control of calcemia and phosphatemia.
16. Interpret the mechanisms regulating the gastrointestinal function.
17. Interpret the principles behind the functioning of the somatosensory system (from receptor transduction to central processing) and the system of special senses.
18. Interpret the renal function systems.
19. Make an oral, written and visual presentation of one's work to a professional or non-professional audience in English and understand the language and proposals of other specialists.
20. Manage information and the organisation and planning of work.

21. Perform simulations of function and adaptation of different physiological functions and interpret the results.
22. Read specialised texts both in English and one's own language.
23. Take responsibility for one's own learning after receiving general instructions.
24. Take sex- or gender-based inequalities into consideration when operating within one's own area of knowledge.
25. Think in an integrated manner and approach problems from different perspectives.
26. Understand the language and proposals of other specialists.
27. Use ICT for communication, information searching, data processing and calculations.
28. Use specialist bibliography in biology.

## **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.

### PROGRAM THEORY

#### 1-Introduction to Animal Physiology:

- Brief history of 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. Neuro
- Synapse. Basics of Neurochemistry. Neurotransmission.
- Synaptic integration.

#### 3. 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

#### 4. Sensory Physiology:

- Sensory receptors. Concept. Type. Transduction mechanisms.

- Somatosensory receptors. Touch and pressure. Thermoreceptors. Nociception. Pathways processing somatosensory information.

- Special Senses. Chemoreception: smell and taste.

- Photoreception: the human eye

- Hearing and equilibrium: human ear.

#### 5. The autonomic nervous system

- Sympathetic and parasympathetic

#### 6. Somatic motor system

- Organization cord. Muscle organs and spinal reflexes.

- Organization supramedullary. The role of the cerebral cortex, cerebellum and basal ganglia

#### 7. Activation SNC:

- Reticular system. Wakefulness and sleep. Electroencephalogram.

#### 8. 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

## 9. Muscle Physiology

- Type of muscle tissues: anatomical and functional characteristics.
- Striated skeletal muscle
- Cardiac muscle
- Visceral smooth muscle

## 10. 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

## 11. Respiratory Physiology:

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

## 12. Renal Physiology:

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

## 13. 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

## 14. Control of body temperature

## 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.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

## Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Theoretical lectures	39	1.56	1, 24, 27, 3, 5, 6, 7, 9, 8, 26, 11, 10, 20, 14, 15, 13, 12, 16, 18, 17, 22, 25, 21, 4, 19, 23, 2, 28
seminars and problems	9	0.36	1, 24, 27, 3, 5, 6, 7, 9, 8, 26, 11, 10, 20, 14, 15, 13, 12, 16, 18, 17, 22, 25, 21, 4, 19, 23, 2, 28
Type: Supervised			
problems resolution	2	0.08	3, 23, 28
seminars preparation	6	0.24	1, 24, 27, 3, 26, 20, 22, 25, 4, 19, 23, 2
Type: Autonomous			
problem resolution	10	0.4	21, 4, 28
study	60	2.4	5, 6, 7, 9, 8, 11, 10, 14, 15, 13, 12, 16, 18, 17, 22, 21, 4, 28
work preparation	10	0.4	1, 24, 27, 3, 5, 6, 7, 9, 8, 26, 11, 10, 20, 14, 15, 13, 12, 16, 18, 17, 22, 25, 21, 4, 19, 23, 2, 28

## 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 2-4 short questions to be developed and 10-14 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

## Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Cases, problems and work: written / oral	25%	6	0.24	1, 24, 27, 3, 5, 6, 7, 9, 8, 26, 11, 10, 20, 14, 15, 13, 12, 16, 18, 17, 22, 25, 21, 4, 19, 23, 2, 28
Written exam of theoretical knowledge	75%	8	0.32	1, 24, 27, 3, 5, 6, 7, 9, 8, 26, 11, 10, 20, 14, 15, 13, 12, 16, 18, 17, 22, 25, 21, 4, 19, 23, 2, 28

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Títol - Fisiología humana [Recurs electrònic]

Edició 4a ed

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Edició 6a ed.

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

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

Edició: 24ª ed.

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

## Software

No software is used