



**COURSE DATA**

**DATA SUBJECT**

**Code:** 33207  
**Name:** Human physiology and exercise  
**Cycle:** Undergraduate Studies  
**ECTS Credits:** 9  
**Academic year:** 2026-27

**STUDY (S)**

Degree	Center	Acad. year	Period
1312 - Degree in Physical Activity and Sport Sciences	Facultat de Ciències de l'Activitat Física i Esports	1	Annual
1331 - Degree in Physical Activity and Sport Sciences (Ont)	Facultat de Ciències de l'Activitat Física i Esports	1	Annual
1938 - Doble grado en Nutrición Humana y Dietética y CAFD	Facultat de Farmàcia i Ciències de l'alimentació	1	

**SUBJECT-MATTER**

Degree	Subject-matter	Character
1312 - Degree in Physical Activity and Sport Sciences	Physiology	BASIC
1331 - Degree in Physical Activity and Sport Sciences (Ont)	Fisiología	BASIC
1938 - Doble grado en Nutrición Humana y Dietética y CAFD		

**COORDINATION**

GOMEZ CABRERA M CARMEN

**SUMMARY**

The goal of Physiology is to study the nature of a living organism in a functional way. Thus, we aim to study the function of different tissues, organs, and systems, and their regulation and interaction in the living beings.

Exercise Physiology is the science that aim to study the functioning of different tissues, organs, and systems in living beings during exercise, since the molecular and cellular level to the higher level of integration. The interrelation between the different systems and with the environment and the regulation mechanisms that make the practice of physical exercise possible are also being studied in exercise physiology at present. Moreover, exercise physiology deals with the structural and functional modifications as a consequence of exercise training.



## PREVIOUS KNOWLEDGE

### RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

### OTHER REQUIREMENTS

A basic knowledge in Biology, Physics and Chemistry is advisable.

## COMPETENCES / LEARNING OUTCOMES

### 1312 - Degree in Physical Activity and Sport Sciences

Apply information and communication technologies (ICTs) in the field of physical activity and sport sciences.

Apply physiological principles to the different fields of physical activity and sport.

Apply the principles of fundamental rights, gender equality, equal opportunities, universal accessibility for people with disabilities, the culture of peace and democratic values.

Evaluate physical fitness and prescribe health-oriented physical exercises.

Identify health risks derived from inappropriate physical and sporting activities and propose alternatives.

Know and understand the effects of the practice of physical exercise on the function of the human body.

Know and understand the fundamentals of physical fitness for physical activity and sport.

Know and understand the physiological factors that determine the practice of physical activity and sport.

Plan, implement and evaluate physical activity and sports programmes targeted at special populations.

Promote and evaluate the acquisition of enduring and autonomous habits of practising physical activity and sport.

Understand the scientific literature in the field of exercise physiology, in English and in other languages with significant presence in science.

Use the sources of certified scientific knowledge in the field of physical activity and sport sciences.

### 1331 - Degree in Physical Activity and Sport Sciences (Ont)

Apply information and communication technologies (ICTs) in the field of physical activity and sport sciences.

Apply physiological principles to the different fields of physical activity and sport.



Apply the principles of fundamental rights, gender equality, equal opportunities, universal accessibility for people with disabilities, the culture of peace and democratic values.

Evaluate physical fitness and prescribe health-oriented physical exercises.

Identify health risks derived from inappropriate physical and sporting activities and propose alternatives.

Know and understand the effects of the practice of physical exercise on the function of the human body.

Know and understand the fundamentals of physical fitness for physical activity and sport.

Know and understand the physiological factors that determine the practice of physical activity and sport.

Plan, implement and evaluate physical activity and sports programmes targeted at special populations.

Promote and evaluate the acquisition of enduring and autonomous habits of practising physical activity and sport.

Understand the scientific literature in the field of exercise physiology, in English and in other languages with significant presence in science.

Use the sources of certified scientific knowledge in the field of physical activity and sport sciences.

## DESCRIPTION OF CONTENTS

### 1. General Physiology.

- UNIT 1. Introduction to Human and Exercise Physiology
- UNIT 2. Internal environment. Homeostasis. Body fluids
- UNIT 3. Transport of substances through the cell membrane
- UNIT 4. Membrane potentials and action potentials
- UNIT 5. Propagation of the cell action potential
- UNIT 6. Smooth and cardiac muscle physiology
- UNIT 7. Skeletal muscle physiology
- UNIT 8. Skeletal muscle fiber types and muscle force

### 2. Nervous System Physiology.

- UNIT 9. Organization of the nervous system
- UNIT 10. Autonomic nervous system
- UNIT 11. Sensory physiology
- UNIT 12. Organization of the motor system
- UNIT 13. Nervous control of the motor system
- UNIT 14. Superior functions of the nervous system
- UNIT 15. Neuromuscular adaptations to exercise



### 3. Endocrinology.

- TEMA 16. Introduction to Endocrinology
- TEMA 17. Pituitary hormones and their control by the hypothalamus
- TEMA 18. Sexual hormones
- TEMA 19. Adrenocortical hormones
- TEMA 20. Thyroid hormones. Calcium and phosphate metabolism
- TEMA 21. Pancreatic hormones. Glycemic control
- TEMA 22. Endocrinological adaptations to exercise

### 4. Blood Physiology.

- TEMA 23. Blood functions and general components
- TEMA 24. Erythrocytes. Genesis of blood cells
- TEMA 25. Resistance of the body to infection
- TEMA 26. Physiology of the hemostasis
- TEMA 27. Hematological adaptations to exercise

### 5. Cardiovascular Physiology.

- TEMA 28. Cardiovascular functions and general components
- TEMA 29. Electrical activity of the heart. The normal electrocardiogram
- TEMA 30. Mechanical activity of the heart. Cardiac output and cardiac cycle
- TEMA 31. Arterial, capillary, venous and lymphatic circulation
- TEMA 32. Arterial pressure. Exercise modifications
- TEMA 33. Cardiovascular adaptations to exercise. Cardiovascular regulation

### 6. Respiration.

- TEMA 34. Respiratory physiology. Pulmonary ventilation
- TEMA 35. Diffusion of oxygen and carbon dioxide through the respiratory membrane
- TEMA 36. Transport of oxygen in blood
- TEMA 37. Transport of carbon dioxide in blood
- TEMA 38. Respiratory adaptations to exercise. Respiratory regulation

### 7. Kidneys.

- TEMA 39. Introduction to the kidneys physiology. Glomerular filtration
- TEMA 40. Tubular functions
- TEMA 41. Renal regulation of fluid osmolarity and sodium concentration
- TEMA 42. Regulation of acid-base balance
- TEMA 43. Renal function and physical exercise



## 8. Exercise physiology.

- TEMA 44. Exercise metabolism I
- TEMA 45. Exercise metabolism II
- TEMA 46. Energetics and metabolic rate in basal conditions and during exercise
- TEMA 47. Energy expenditure at rest and during exercise
- TEMA 48. Oxygen consumption
- TEMA 49. Anaerobic threshold
- TEMA 50. Laboratory tests in exercise physiology
- TEMA 51. Muscle fatigue
- TEMA 52. Exercise performance: Ergogenic aids
- TEMA 53. Exercise performance: Doping
- Seminar 1
- Seminar 2
- Seminar 3

## 9. Laboratory programme

- Practice 1.- Study of the membrane potential (2 hours)
- Practice 2.- Study of the skeletal muscle physiology (2 hours)
- Practice 3.- Anthropometry I (2 hours)
- Practice 4.- Anthropometry II (2 hours)
- Practice 5.- Exploration of the nervous system I (2 hours)
- Practice 6.- Exploration of the nervous system II (2 hours)
- Practice 7.- Cardiac auscultation (2 hours)
- Practice 8.- Blood pressure measurement (2 hours)
- Practice 9.- Electrocardiography (2 hours)
- Practice 10.- Cardiovascular adaptations to exercise (2 hours)
- Practice 11.- Spirometry simulation (2 hours)
- Practice 12.- Respiratory adaptations to exercise simulation (2 hours)
- Practice 13.- Maximal oxygen consumption (2 hours)

## WORKLOAD

### PRESENCIAL ACTIVITIES

Activity	Hours
Theory	60,00
Laboratory	30,00
<b>Total hours</b>	<b>90,00</b>

### NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	52,00
Independent study and work	67,00



Preparation of lessons	0,00
Preparation for assessment activities	16,00
Resolution of case studies	0,00
<b>Total hours</b>	<b>135,00</b>

## TEACHING METHODOLOGY

Our subject contents will be divided into two sections that will be developed coordinately (human and exercise physiology). The theoretical content in each section will be developed in the lectures. The practical content will be underpinned in the theoretical concepts. We will follow no more than two reference books in our subject.

Taking into account both the theoretical and the practical classes we will suggest that the students develop an individual/group project that will be guided during the supporting seminars. The students will share their doubts with the other students and with the professor during the seminars. Moreover, the students have to develop their own personal study work to achieve competence in physiology. The students' projects will be made public.

## EVALUATION

The following evaluation system will be used to respond to the assessment of the competences involved in this matter:

1. Preparation and presentation of the seminar (10% of the final grade)
2. Final theoretical exam with 50 test questions (70% of the final grade)
3. Final practice exam with 10 test questions (10% of the final grade)
4. Attendance and / or completion of practical activities (10% of the final grade)

In case of not passing the two exams that will be taken, the rest of the marks obtained by the student will not be added and, therefore, it will not be possible to pass the subject that is passed with a minimum of 5  
ssed with a minimum of 5

## REFERENCES



- Segura Cardona R (1987). Prácticas de Fisiología. 1ª ed. Barcelona. Ediciones científicas y técnicas, Masson-Salvat. -Fox SI (2008). Fisiología Humana. 8ª ed. Madrid. Ed. McGraw-Hill Interamericana de España S.A.U.
- Guyton AC, Hall JE (2006). Tratado de Fisiología Médica. 12ª ed. Madrid. Ed. Elsevier. -López-Chicharro J, Fernández-Vaquero A (2009). Fisiología del Ejercicio. 3ª ed. Panamericana