

**COURSE DATA****Data Subject**

|                      |                                 |
|----------------------|---------------------------------|
| <b>Code</b>          | 43091                           |
| <b>Name</b>          | Physiology of physical exercise |
| <b>Cycle</b>         | Master's degree                 |
| <b>ECTS Credits</b>  | 4.0                             |
| <b>Academic year</b> | 2023 - 2024                     |

**Study (s)**

| <b>Degree</b>                    | <b>Center</b>                      | <b>Acad. year</b> | <b>Period</b> |
|----------------------------------|------------------------------------|-------------------|---------------|
| 2141 - M.U. en Fisiología 12-V.2 | Faculty of Medicine and Odontology | 1                 | First term    |

**Subject-matter**

| <b>Degree</b>                    | <b>Subject-matter</b> | <b>Character</b> |
|----------------------------------|-----------------------|------------------|
| 2141 - M.U. en Fisiología 12-V.2 | 5 - Optional subject  | Optional         |

**Coordination**

| <b>Name</b>              | <b>Department</b> |
|--------------------------|-------------------|
| GOMEZ CABRERA, M. CARMEN | 190 - Physiology  |
| VIÑA RIBES, JOSE         | 190 - Physiology  |

**SUMMARY**

Exercise Physiology is the science that studies the functioning of the human organs and systems during physical exercise, from the molecular and cellular level to the integral level of the person, the interrelationship between them and with the external environment, as well as the mechanisms of regulation and functional integration that make it possible to carry out physical exercise. In addition, it encompasses the study of both structural and functional modifications that chronic exercise, or physical training, causes.

**PREVIOUS KNOWLEDGE**



### **Relationship to other subjects of the same degree**

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

### **Other requirements**

There are no prerequisites for taking the subject.

## **OUTCOMES**

### **2141 - M.U. en Fisiología 12-V.2**

- Students should apply acquired knowledge to solve problems in unfamiliar contexts within their field of study, including multidisciplinary scenarios.
- Students should be able to integrate knowledge and address the complexity of making informed judgments based on incomplete or limited information, including reflections on the social and ethical responsibilities associated with the application of their knowledge and judgments.
- Students should communicate conclusions and underlying knowledge clearly and unambiguously to both specialized and non-specialized audiences.
- Students should demonstrate self-directed learning skills for continued academic growth.
- Students should possess and understand foundational knowledge that enables original thinking and research in the field.
- Know how to write and prepare presentations to present and defend them later.
- To acquire a critical attitude that allows you to make reasoned judgments and defend them with rigor and tolerance.
- Search, order, analyze and synthesize scientific information (databases, scientific articles, bibliographic repertoires), selecting the pertinent to focus current knowledge on a topic of scientific interest in Physiology.
- Discover the physiological adaptations and responses of the different devices and systems to physical exercise and identify its different applications for the prevention and treatment of diseases.

## **LEARNING OUTCOMES**

**English version is not available**

## **DESCRIPTION OF CONTENTS**

**1. Responses and adaptations of the different body systems to exercise**

Neuromuscular adaptations to training

Responses and adaptations of the endocrine system to exercise

Cardiovascular and hematological responses and adaptations to physical exercise Responses and adaptations of the respiratory system to physical exercise

Metabolic responses and adaptations to physical exercise

Functional assessment of the athlete

**2. Physical exercise and oxidative stress**

Physical exercise and oxidative stress

Free radicals and cell signaling in skeletal muscle

Supplementation with antioxidant vitamins in sports

**3. Physical Exercise for the prevention and treatment of different diseases.**

Evidences on the benefits of the prescription of physical exercise in different pathologies.

Physical exercise acts as a drug.

Physical exercise in the prevention and treatment of Senile Sarcopenia and Frailty

Physical exercise in the prevention and treatment of neurodegenerative diseases (i.e. Alzheimer's disease)

Physical exercise and environmental pollutants

**WORKLOAD**

| ACTIVITY                             | Hours         | % To be attended |
|--------------------------------------|---------------|------------------|
| Theory classes                       | 24,00         | 100              |
| Tutorials                            | 3,00          | 100              |
| Other activities                     | 2,00          | 100              |
| Development of individual work       | 20,00         | 0                |
| Study and independent work           | 15,00         | 0                |
| Readings supplementary material      | 5,00          | 0                |
| Preparation of evaluation activities | 15,00         | 0                |
| Preparing lectures                   | 6,00          | 0                |
| Resolution of case studies           | 10,00         | 0                |
| <b>TOTAL</b>                         | <b>100,00</b> |                  |



## TEACHING METHODOLOGY

- Theoretical classes
- Conferences provided by experts in the field.
- Debate and directed discussions on the main topics in exercise physiology
- Face-to-face and electronic tutoring with teachers.

## EVALUATION

### Evaluation system:

- Written exam consisting of 5 development questions: evaluation up to 10 points.

Minimum passing grade: 5 points.

## REFERENCES

### Basic

- McArdle WD, Katch FI & Katch VL. (1996). Exercise physiology : energy, nutrition and human performance. Williams & Wilkins, Baltimore, Md.; London.
- Powers SK & Howley ET. (2001). Exercise Physiology. Theory and Application to Fitness and Performance. New York.
- Taylor AE, Matalon S & Ward P. (1986). Physiology of oxygen radicals : Symposium on oxygen radical damage in lung tissue : Meeting : Papers. American Physiological Society, Bethesda, MD.

### Additional

- Gomez-Cabrera MC, Ristow M & Vina J. (2012). Antioxidant supplements in exercise: worse than useless? Am J Physiol Endocrinol Metab 302, E476-477; author reply E478-479.
- Gomez-Cabrera MC, Domenech E, Romagnoli M, Arduini A, Borrás C, Pallardo FV, Sastre J & Vina J. (2008). Oral administration of vitamin C decreases muscle mitochondrial biogenesis and hampers training-induced adaptations in endurance performance. Am J Clin Nutr 87, 142-149.
- Vina J, Sanchis-Gomar F, Martinez-Bello V & Gomez-Cabrera MC. (2012). Exercise acts as a drug; the pharmacological benefits of exercise. Br J Pharmacol 167, 1-12.