

POLI ESCOLA SUPERIOR EDUCAÇÃO COMUNICAÇÃO DESPORTO TÉCNICO GUARDA	SUBJECT DESCRIPTION	MODELO PED.012.03
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Course	Degree in Sports					
Subject	Exercise Physiology					
Academic year	2023-2024	Curricular year	2nd	Study period	1st semester	
Type of subject	Compulsory	Student workload (H)	Total: 108	Contact: 52,5	ECTS	4
Professor(s)	Faber Sergio Bastos Martins					
<input checked="" type="checkbox"/> Area/Group Coordinator <input type="checkbox"/> Head of Department	(select)	Carolina Júlia Félix Vila-Chã				

PLANNED SUBJECT DESCRIPTION

1. LEARNING OBJECTIVES

At the end of this course the student should be able to:

- a) Understand the importance of exercise physiology and sports have in understanding the effects of physical exertion on the sports performance, fitness and health of humans;
- b) Understand and explain the processes of adaptation to different types of exercise, either within the acute response or the chronic effects of systematic practice;
- c) Accurately describe and interpret the structures and function of the neuromuscular system, as well as their physiological changes due to the different types of exercise;
- d) Understand the mechanisms of regulation and production of muscle strength;
- e) Describe the basic process of energy systems and to understand the functioning of these systems according to physical exercise and/or training session characteristics;
- f) Understand the role of the hormonal regulation of the metabolism during exercise and its effect on the chronic adaptations;
- g) Understand and to properly apply methodologies to access muscular fitness (strength and flexibility);
- h) Understand the physiological basis underpinning the planning and prescription of strength and power training.

2. PROGRAMME

A. Introduction to exercise physiology and sport

- A.1. Object of study of exercise physiology and sports
- A.2. History and evolution of exercise physiology
- A.3. Foundation for the understanding of research in exercise physiology
- A.4. Acute physiological adaptations vs. chronic

B. Production and regulation of voluntary movement: - neuromuscular system

B.1. Skeletal muscle

- B.1.1. Structure and Function
- B.1.2. The sliding Filament theory
- B.1.3. Muscle fibers types
- B.1.4. Mechanics of muscle contraction

B.2. Neural control of the muscle

- B.2.1. Structure and function of the nervous system
- B.2.2. The motor unit

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B.2.3. Neural mechanisms of force production

C. Muscle metabolism in exercise

C.1. Energy substrates

C.2. Basic energy systems

C.3. Metabolic adaptations to exercise and its implications for practice

D. Hormonal regulation during exercise

D.1. Basics of Endocrine System

D.2. Hormonal regulation of metabolism

D.3. Hormonal regulation of fluid and electrolytes

D.4. Responses to acute and chronic exercise

Theoretical-practical course:

E. Physical Evaluation and Physiological

E.1. Fitness assessment vs. physiological assessment

E.2. Laboratory and athlete's preparation

E.3. Data collection and analysis

E.4. Protocol evaluation planning

F. Muscle strength Assessment

F.1. Muscle strength expressions

F.2. Importance of strength on performance, health and injury prevention

F.3. Protocols for assessing strength

F.4. Muscle power and rate of force production output

F.5. Muscular endurance assessment

G. Flexibility Testing

G.1. Types of flexibility

G.2. Importance of flexibility on performance, health and injury prevention

G.3. Evaluation protocols

3. COHERENCE BETWEEN PROGRAMME AND OBJECTIVES

The learning objectives defined for this UC aimed to provide the students with fundamental knowledge and skills for understanding the acute and chronic responses of biological systems to human exercise.

Thus, the syllabus of this UC were selected and structured according to the learning objectives:

- Section A of the syllabus aims to achieve the point a) of the objectives
- Section B of the syllabus aims to achieve the objectives b), c), d) and h).
- Section C of the syllabus aims to achieve the objectives of paragraph e).
- Section D of the syllabus aims to achieve the objectives f) and h).

4. MAIN BIBLIOGRAPHY

Bottinelli R & Reggiani C. (2000). Human skeletal muscle fibres: molecular and functional diversity. Prog Biophys Mol Biol 73: 195-262.

Brooks G. & Fahey, T. (2004): Exercise Physiology: Human Bioenergetics and Its Applications. (4th ed.). McGraw-Hill Education.

Haff, I & Dumke, C. (2012). Laboratory Manual for Exercise Physiology. Human Kinetics.

Kenney, W, Wilmore, J. ; Costill, D. (2021): Physiology of Sport and Exercise. (8th ed). Human Kinetics.

Mcardle, W, Katch, F., Katch, V.(2014): Exercise Physiology – Energy, Nutrition, and Human performance (8th ed.). Lippincott Williams & Wilkins.

Murray, R. & Kenney, W.L. (2020): Practical Guide to Exercise Physiology: The Science of Exercise Training and Performance Nutrition (2nd ed.). Human Kinetics.

Poortmans J. & Boisseau N. (2013): Bioquímica das Atividades Físicas e Desportivas. Edições Piaget.

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Powers, S., Howley, E. (2020): Exercise physiology: theory and application to fitness and performance (11th ed.) McGraw-Hill Education.

Rebecca T & Christopher G.(2013). Physiological tests for elite athletes (2nd ed.). Human Kinetics.

5. TEACHING METHODOLOGIES (INCLUDING EVALUATION)

Teaching Methodologies

The classes consist of theory sessions (theoretical course) and theoretical-practical or laboratory context (theoretical-practical course). To achieve the proposed methodology theoretical and practical training were implemented. The methods and teaching techniques applied were: expository method with the observation models and viewing short films illustrative of the systems studied and the method of group interaction for the purpose of consolidation / systematization of content covered and their applicability in different sports. The theoretical-practical course classes intended to develop more operational skills. These classes, and whenever possible, includes lab activities to enable the collection of data, interpretation and discussion of the results.

Evaluation Rules: The evaluation is conducted in accordance with the "Regulation Scheme Frequency and Student Assessment." The normal mode of evaluation will be by frequency. The evaluation focuses on the frequency of student performance in the following components / evidence:

- **written tests (2) - 80% (minimum grade in each test \geq 8 points);**
- **Practical test (1) – 20% (laboratory work)**

If the final grade is not reached minimum (9.5), the student will take the final exam (100%).

6. COHERENCE BETWEEN TEACHING METHODOLOGIES AND OBJECTIVES

The methodologies chosen were selected in order to maximize the acquisition of the contents associated with each objective:

1. Exposure of content (orally and through digital means) - this methodology is used to display the content associated with all learning objectives;
2. Research work, analysis and interpretation of text/scientific articles - this methodology was used primarily to consolidate the content associated with the objectives defined in paragraphs c), d), e) e f).
3. Application of knowledge in practical classes through the implementation of laboratory activities and preparation of reports - this methodology is used to consolidate the acquisition of content associated objectives defined in points g) and h).

7. ATTENDANCE

According to the ESECD Regulation.

8. CONTACTS AND OFFICE HOURS

fabermartins@ipg.pt – Monday: 15:30-17:30; Tuesday: 15:00-18:00

DATE

18 de setembro de 2023

<p>POLI</p> <p>ESCOLA SUPERIOR</p> <p>EDUCAÇÃO</p> <p>COMUNICAÇÃO</p> <p>DESPORTO</p> <p>TÉCNICO</p> <p>GUARDA</p>	<p>SUBJECT DESCRIPTION</p>	<p>MODELO</p> <p>PED.012.03</p>
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Professor

(signature)

Area/Group Coordinator

(signature)