

Course Unit	Exercise Physiology II		Field of study	Sport Sciences	
Bachelor in	Sports - Minor in Recreation and Leisure		School	School of Education	
Academic Year	2022/2023	Year of study	2	Level	1-2
Type	Semestral	Semester	2	Code	9563-625-2203-00-22
Workload (hours)	216	Contact hours	T 48	TP 36	PL 3
			TC -	S -	E -
			OT 3	O -	

T - Lectures; TP - Lectures and problem-solving; PL - Problem-solving, project or laboratory; TC - Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s) Pedro Miguel Queirós Pimenta Magalhaes

#### Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:

1. Describe the energy systems and understand how to operate these systems depending on the characteristics of physical exercise and/or training conducted.
2. Know and interpret the physiological events that occur during the period of recovery after exercise.
3. Understand and interpret the muscle contraction mechanism, as well as acute and chronic changes that occur with exercise and training respectively.
4. Understand what mechanisms are involved and what are the processes underlying the muscle adaptations to training.
5. Describe the cardiovascular, respiratory and endocrine systems and interpret the changes that occur in these systems depending on the type of exercise and/or the specific training conducted.
6. Understand the general process of reactive oxygen species formation and its participation in the muscle damage process.

#### Prerequisites

Not applicable

#### Course contents

1. Introduction to the exercise physiology; 2. Energy systems; 3. Structure and function of skeletal muscle; 4. Neuromuscular adaptations to training; 5. Cardiorespiratory adaptations; 6. Exercises in hyperbaric and hipobaric environments; 7. Endocrine system and exercise physiology; 8. Reactive oxygen species (ROS) and exercise.

#### Course contents (extended version)

1. Introduction to the exercise physiology
  - Acute adaptations to exercise
  - Chronic adaptations to training
2. Energy systems
  - Alactic anaerobic system
  - Lactic anaerobic system
  - Aerobic system
  - Metabolic adaptations to exercise
  - Metabolic adaptations to training
3. Structure and function of skeletal muscle
  - Skeletal muscle and exercise
  - Skeletal muscle adaptations to training
4. Neuromuscular adaptations to training
  - Neural control of muscle movements
  - Strength gains
  - Sex and age differences
5. Cardiorespiratory adaptations
  - Cardiovascular adaptations
  - Respiratory adjustments
  - Evaluation of aerobic capacity
6. Exercises in hyperbaric and hipobaric environments
  - Exercise at altitude
  - Acute and chronic adaptations to altitude
  - Physiological responses to diving
7. Endocrine system and exercise physiology
  - Hormones secretory glands
  - Hormonal response to exercise
8. Reactive oxygen species (ROS) and exercise
  - Types and sources of ROS
  - ROS and exercise

#### Recommended reading

1. BROOKS, GA; FAHEY, TD; WHITE, TP; BALDWIN, KM (2000). Exercise Physiology. Human bioenergetics and it's applications. (Third Edition). Mayfield Publishing Company.
2. FOSS, ML; KETEYIAN, SJ (2000). Bases fisiológicas do exercício e do esporte. (6ª Edição). Editora Guanabara Koogan.
3. POWERS, SK ; HOWLEY, ET (2014). Fisiologia do exercício. Teoria e aplicação ao condicionamento e ao desempenho. (8ª Edição). Manole.
4. McArdle, W; Katch, F; Katch, V (2019). Fisiologia do Exercício. Nutrição, Energia e Desenvolvimento Humano (8ª Edição). Guanabara Koogan. ISBN: 978-85-277-2986-4
5. WILMORE, SH; COSTILL, DL; KENNEY, WL (2015). Physiology of Sport and Exercise. (6th Edition). Human Kinetics.

#### Teaching and learning methods

Oral exposure and through multimedia. Labor research, analysis and interpretation of text/scientific articles. Worksheets. Practice tests in the laboratory. Preparation of reports of laboratory activities. Development of learning situations.

#### Assessment methods

1. Continuous evaluation - (Regular, Student Worker) (Final)
  - Intermediate Written Test - 70% (2 written tests (equal weight))
  - Practical Work - 20% (1 group work)

**Assessment methods**

- Experimental Work - 10% (Content consolidation work and assiduity)
- 2. Exam evaluation - (Regular, Student Worker) (Supplementary, Special)
- Final Written Exam - 100% (1 written test)

**Language of instruction**

Portuguese

**Electronic validation**

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03-01-2023	19-01-2023	19-01-2023	20-01-2023