

Course Unit	Exercise for the Elderly		Field of study	Sport Sciences	
Master in	Physical Exercise and Health		School	School of Education	
Academic Year	2025/2026	Year of study	1	Level	2-1
Type	Semestral	Semester	2	Code	6125-520-1204-00-25
ECTS credits	6.0				
Workload (hours)	162	Contact hours	T 10	TP -	PL 10
			TC -	S 20	E -
			OT 5	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) António Miguel de Barros Monteiro, Catarina Margarida Silva Vasques

Learning outcomes and competences

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

1. Understands the several theories about the biological aging process, as well as the mechanisms involved.
2. Have the ability to assess and prescribe exercise adequately for people with advanced age.
3. Understands how physical exercise interferes with the elderly human body.
4. Understands the benefit / risk from different types / characteristics of physical activity in the body of the elderly.
5. Understands the mechanisms of posture and its implications in everyday activities, physical and sports.
6. Knowing the mechanisms of postural control and cognitive processing.
7. Understand the physiological, cognitive and psychomotor effects of exercise in the elderly.

Prerequisites

Before the course unit the learner is expected to be able to:
Evidence systematization of knowledge acquired in training.

Course contents

Process of biological aging; Physiology exercise in the elderly; Stability and postural control; Changes associated with aging; Benefits of Exercise in the elderly; Prescription of physical exercise in the elderly; Motor decline during aging; Postural control and cognitive processing; Physical exercise and cognitive function; Exercise programs.

Course contents (extended version)

1. Process of biological aging.
 - Theories of biological aging (genetic and stochastic);
 - Body composition and aging.
2. Exercise physiology in the elderly.
 - Physiological effects of exercise and training in elderly;
 - Evidence of the relationship / association between lifestyle and healthy aging.
3. Stability and postural control.
 - Posture definition;
 - Types of positions;
 - Segmentar alignment;
 - Mechanical concept of posture;
 - Sensory systems and posture;
 - Constraints of balance and stability;
 - Posture and movement strategies;
 - Sensory and posture strategies;
 - Loss of stability (fall);
 - Evaluation of posture.
4. Benefits of Exercise in the elderly.
 - Changes in physical and functional fitness;
 - Changes in body composition;
 - Psychological and social changes.
5. Prescription of physical exercise in the elderly.
 - Aerobic exercises;
 - Strengthening exercises;
 - Flexibility exercises;
 - Exercises for balance and coordination;
 - Exercises to avoid;
 - Caring for older people with certain diseases and medications.
6. Types of training.
 - Aerobic training;
 - Strength training;
 - Multicomponent training.
7. Motor decline during aging.
 - Only factor hypothesis;
 - Differentiated decline.
8. Postural Control and cognitive processing.
 - Postural maintenance;
 - Postural tasks;
 - Cognitive tasks;
 - Memory Tasks or calculation;
 - Sensory motor control (central nervous system and sensory receptors);
 - Volume structural brain and motor performance measures;
 - Motivational systems;
 - Risk of falling.
9. Physical exercise and cognitive function.
 - Neuroprotective mechanisms;
 - Neurodegenerative disease and other dementias;
 - Structural and functional changes of the brain.
10. Exercise Programs.
 - Characteristics;
 - Training benefits;
 - New motor tasks.

Recommended reading

1. ACSM (2013). ACSM's guidelines for exercise testing and prescription (9th ed.). Baltimore: Lippincott Williams & Wilkins.
2. De Vries NM, et al. (2012). Effects of physical functioning, physical activity and quality of life in communitydwelling older adults with impaired mobility. Ageing Res Ver
3. Mota, MP; Figueiredo, PA; Duarte, JA (2004). Teorias biológicas do envelhecimento. Revista Portuguesa de Ciências do Desporto, 4(1), 81-110.
4. Rachael DS, et al. (2010). Motor Control and Aging: Links to Age-Related Brain Structural, Functional, and Biochemical Effects. Neurosci Biobehav Rev.
5. Spirduso, W. W. , Francis, K. L. , & MacRae, P. G. (2005). Physical Dimensions of Aging. 2 ed. Champaign IL: Human Kinetics.

Teaching and learning methods

Oral presentation of content, using multimedia and / or interactive. Research work, analysis and interpretation of scientific texts.

Assessment methods

1. Continuous evaluation - (Regular, Student Worker) (Final)
 - Practical Work - 40% (2 Practical work group (20%+20%))
 - Intermediate Written Test - 60% (Written Test)
2. Exam Evaluation - (Regular, Student Worker) (Supplementary, Special)
 - Final Written Exam - 100% (Written test)

Language of instruction

1. Portuguese
2. Portuguese, with additional English support for foreign students.

Electronic validation

António Miguel de Barros Monteiro, Catarina Margarida Silva Vasques	António Miguel de Barros Monteiro	Catarina Margarida Silva Vasques	Carlos Manuel Costa Teixeira
21-01-2026	21-01-2026	23-01-2026	03-02-2026