INSTITUTO POLITÉCNICO DE BRAGANÇA

Course Unit	Biology of Aging			Field of study	Biology and Biochemistry		
Bachelor in	Gerontology			School	School of Health		
Academic Year	2021/2022	Year of study	1	Level	1-1	ECTS credits	5.0
Type	Semestral	Semester	2	Code	9833-346-1202-00-21		

Workload (hours)	135	Contact hours	T	TP	PL	TC	S	E	OT	O
			-	28	-	12	-	-	16	-

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): Sara Garcia Diogo Goncalves

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. - Describe the biological models that explaine the aging process;
2. - Describe the main strutural and functional changes associated with age;
3. - Describe possible implications in quality of live in the elderly related with biological changes;
4. - Identify functional assessment tools in the elderly;
5. - Point out health and well being protective strategies mainly directed to sucessfull aging.

Prerequisites

Not applicable

Course contents

Biological aging: definitions and theories and the main biochemical and molecular mechanisms related to cell aging. Aging of the main organ systems. Biological Rhythms and Biomarkers of aging. Biological foundations of neurocognitive aging. Biological Theories of Aging / Theoretical models. Different types of Homeostasis. Final considerations on immortality.

Course contents (extended version)

1. Biological Aging:
   - Basic terms definition and characterization of the senescence process;
   - Biological theories of aging.
2. Cellular and molecular aging:
   - Cellular division, mitotic cycle regulation;
   - Oxidative stress;
   - Genetic aspects of the aging process.
3. Aging of the main systems in the human organism;
   - Cardiovascular system;
   - Respiratory system;
   - Locomotor system;
   - Conectives tissues, colagen, elastin, fibronectina, . . .
   - Immune system;
   - Digestive and urinary system;
   - Endocrin system.
4. Aging and biological rhythms;
5. Aging biomarkers;
6. Biological fundamentals of neurocognitive aging;
7. Biological Theories of Aging / Theoretical Models
8. Life and its regulation - Varieties of Homeostasis
   - Automatic and cultural homeostasis
9. Brain / macro-organization: three domains
10. The limbic system
11. he Frontex: the subregions
    - Frontex and Cognition
    - Frontal cortex and its relationship with the limbic system
    - Frontal cortex and social behavior
12. Medicine, Immortality and Algorithms
13. Some Final Thoughts on the Future of Humanity

Recommended reading

1. Matt R. Kaeberlein, George M. Martin, Handbook of the Biology of Aging (Eighth Edition), Academic Press, 2016
2. Freitas, E; Py, L; Tratado de Geriatria e Gerontologia, 2011, 3ª edição, Guanbara Koogan
3. Moody, H. R., & Sasser, J. R. (2018). Aging: Concepts and controversies. Los Angeles Sage
4. Maddox, G. L. (Ed.). (1995). The encyclopedia of aging: A comprehensive resource in gerontology and geriatrics (2nd ed.). Springer.

Teaching and learning methods

- Theoretical classes: explanatory and reflective lessons using the available audio-visual aids. Theroretical-Practical classes: Bibliographic research, critical cases and document analysis.

Assessment methods

1. Continuous evaluation - (Regular, Student Worker) (Final)
   - Intermediate Written Test - 35% (Biological Mechanisms (cellular and molecular);)
   - Intermediate Written Test - 35% (Aging of the main body systems)
   - Presentations - 30% (Presentation of selected articles framed in the theme of Biology of Aging)
2. Final Written Exam and Presentation - (Regular, Student Worker) (Supplementary, Special)
   - Final Written Exam - 70% (Includes all programmatic items)
   - Presentations - 30% (Presentation of selected articles framed in the theme of Biology of Aging)
3. Final Written Exam - (Regular, Student Worker) (Supplementary, Special)
   - Final Written Exam - 100% (Engloba todos os itens programáticos)

Language of instruction

Portuguese, with additional English support for foreign students.

Electronic validation

Sara Garcia Diogo Goncalves	Hélder Jaime Fernandes	Ana Maria Nunes Português Galvão	Adília Maria Pires da Silva Fernandes
14-03-2022	15-03-2022	16-03-2022	16-03-2022