INSTITUTO POLITÉCNICO DE BRAGANÇA

Course Unit	Ecology and Management of Inland waters			Field of study	Environment Protection		
Bachelor in	Environmental Engineering			School	School of Agriculture		
Academic Year	2022/2023	Year of study	2	Level	1-2	ECTS credits	6.0
Type	Semestral	Semester	2	Code	9099-309-2202-00-22		

Workload (hours)	162	Contact hours	T	30	TP	-	PL	30	TC	-	S	-	E	-	OT	20	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)	Amilcar António Teiga Teixeira

Learning outcomes and competences

At the end of the course unit the learner is expected to be able to:
1. Learning Outcomes (1): To know the typology of aquatic ecosystems and understand abiotic and biotic interactions;
2. Learning Outcomes (2): To use correct methodologies to the sampling and data treatment;
3. Learning Outcomes (3): To detect disturbance factors of aquatic environment and apply different monitoring tools;
4. Learning Outcomes (4): To acquire basic elements to the management of inland waters.
5. Competences (1): capacity to analyze aquatic ecosystems functioning;
6. Competences (2): knowledge to find and analyze different kind of information in order to provide the conservation, mitigation or rehabilitation of each specific aquatic system.

Prerequisites

Before the course unit the learner is expected to be able to:
Knowledge about chemical (water characteristics), biological and ecological sciences.

Course contents

Physical and chemical characterization of freshwater environment. Water quality. Aquatic communities: ecological characterization, sampling design and techniques used to measure the productivity; Functioning of aquatic ecosystems and disturbance events; Management of lotic and lentic ecosystems; Biological tools to detect and quantify; Mitigation and rehabilitation of disturbed systems.

Course contents (extended version)

1. THEORETICAL PROGRAM
    - INTRODUCTION Limnology: Interrelation with other sciences. Inland water ecology and biogeography.
    - ABIOTIC CHARACTERIZATION: Physical, chemical and microbiological parameters. Legislation.
    - BIOTIC CHARACTERIZATION: bacteria and fungi; plants, invertebrates and fish.
    - LOTIC ECOSYSTEMS: hydrodynamics. structure and functioning. Riparian Ecotones. Productivity
    - LENTIC ECOSYSTEMS: stratification. Nutrient, O2 and temperature balance. Trophic classification.
    - BIOMONITORING: bioindicator concept; ecological integrity and assessment metrics.
    - DISTURBANCE: natural and anthropic causes; resistance and resilience; recovery and rehabilitation
    - MANAGEMENT: monitoring and planning; habitat, population and ecosystem management. Legislation
2. PRACTICAL PROGRAM
    - Study Cases: Lotic and lentic ecosystems of the region. Field and laboratorial works.

Recommended reading

1. Calow, P. & Petts, G. (1994). Rivers Handbook. Vol. I & II. Blackwell Science Publications. London.
2. Allan J.D., Castillo M., Capps K.A. (2021). Stream Ecology: Structure and Function of Running Waters. Springer. USA
3. Schreck, C. & Moyle, P. (1990). Methods for Fish Biology. American Fisheries Society. Bethesda.
4. Feio M.J. e Ferreira V. (2019). Rios de Portugal: comunidades, processos e alterações. Imprensa da Universidade de Coimbra. 442pp.
5. Wetzel, R. & Likens, G. (1991). Limnological Analyses. Springer- Verlag. New York.

Teaching and learning methods

Lessons 1) Lectures: sessions will use audiovisual media resources. Laboratory classes - a) field work based on specific methodologies and material (e. g. electrofishing device). b) Laboratorial- identification, data treatment and analyses. 2) Tutorial – practical works started during lectures; Investigation and group works (seminar); library research (B-on).

Assessment methods

1. Alternative 1 - (Regular, Student Worker) (Final)
    - Practical Work - 30%
    - Presentations - 12%
    - Intermediate Written Test - 29%
    - Final Written Exam - 29%
2. Alternative 2 - (Regular, Student Worker) (Supplementary)
    - Final Written Exam - 100%
3. Alternative 3 - (Regular, Student Worker) (Special)
    - Final Written Exam - 100%

Language of instruction

Portuguese, with additional English support for foreign students.

Electronic validation

Amilcar António Teiga Teixeira	José Paulo Mendes Guerra Marques Cortez	Artur Jorge de Jesus Gonçalves	Maria Sameiro Ferreira Patrício
05-12-2022	11-01-2023	24-02-2023	24-02-2023