

**1. General information****Course:** AQUATIC ECOSYSTEMS**Type:** ELECTIVE**Degree:** 340 - UNDERGRADUATE DEGREE PROGRAMME IN ENVIRONMENTAL SCIENCES**Center:** 501 - FACULTY OF ENVIRONMENTAL SCIENCES AND BIOCHEMISTRY**Year:** 4**Main language:** Spanish**Use of additional languages:****Web site:****Code:** 37335**ECTS credits:** 4.5**Academic year:** 2021-22**Group(s):** 40**Duration:** First semester**Second language:** English**English Friendly:** Y**Bilingual:** N**Lecturer:** IVAN TORRES GALAN - Group(s): 40

Building/Office	Department	Phone number	Email	Office hours
Sabatini/0.35	CIENCIAS AMBIENTALES	5472	ivan.torres@uclm.es	monday through thursday, 11:00 to 14:00 (contact by email beforehand)

2. Pre-Requisites

Not established

3. Justification in the curriculum, relation to other subjects and to the profession

The subject of Aquatic Ecology is key in the professional profile of the Environmental Scientist, since it is focused on a set of ecosystems with great social, environmental and economic value. The main objective of the subject is to gain a basic knowledge on the main characteristics of freshwater and marine ecosystems, of their biological communities and of their ecological functions.

This subject has important applications in the fields of freshwater management and wildlife management, providing the student with the basic skills for an integral management of those ecosystems.

4. Degree competences achieved in this course**Course competences**

Code	Description
CB01	Prove that they have acquired and understood knowledge in a subject area that derives from general secondary education and is appropriate to a level based on advanced course books, and includes updated and cutting-edge aspects of their field of knowledge.
CB02	Apply their knowledge to their job or vocation in a professional manner and show that they have the competences to construct and justify arguments and solve problems within their subject area.
CB03	Be able to gather and process relevant information (usually within their subject area) to give opinions, including reflections on relevant social, scientific or ethical issues.
CB05	Have developed the necessary learning abilities to carry on studying autonomously
CB06	Students have developed the ability to work as a team and lead, direct, plan and supervise multidisciplinary teams
E01	Ability to understand and apply basic knowledge.
E02	Capacity for multidisciplinary consideration of an environmental problem
E03	Awareness of the temporal and spatial dimensions of environmental processes
E04	Ability to integrate experimental evidence found in field and/or laboratory studies with theoretical knowledge.
E05	Capacity for qualitative data interpretation
E06	Capacity for quantitative data interpretation
E13	Ability to handle software.
G01	Proficiency in a second foreign language at level B1 of the Common European Framework of Reference for Languages.
G02	Knowledge of Information and Communication Technologies (ICT).
G03	Good oral and written communication
G04	Ethical commitment and professional deontology

5. Objectives or Learning Outcomes**Course learning outcomes****Description**

Knowledge of the basic aspects related to energy and matter flows in communities.

Description of the populations of organisms and the processes that affect them, such as competitive or predation interactions between them, including the modelling of these.

Determination of individual agency responses in relation to their environment, i.e., their conditions and resources

To apply these concepts to the different ecosystems of the Earth (terrestrial and aquatic), assessing them in relation to the morphological and functional adaptations of the organisms and the functioning of the system as a whole.

6. Units / Contents

Unit 1: Introduction

Unit 1.1 Definitions. Brief history of limnology and oceanography

Unit 1.2 Water on Earth

Unit 2: Abiotic factors in aquatic ecosystems

Unit 2.1 Molecular structure of water and physical characteristics of water

Unit 2.2 Light and temperature in water

Unit 2.3 Oxygen, pH, redox

Unit 3: Biotic communities of aquatic ecosystems

Unit 3.1 Lotic and lentic waters

Unit 3.2 Plankton

Unit 3.3 Nekton

Unit 3.4 Benthos

Unit 4: Functioning of aquatic ecosystems

Unit 4.1 Resources and other abiotic factors

Unit 4.2 Primary production

Unit 4.3 Secondary production and trophic webs

Unit 4.4 Biotic interactions

Unit 5: Main aquatic ecosystems

Unit 5.1 Marine ecology

Unit 5.2 Lakes

Unit 5.3 Streams

Unit 5.4 Wetlands

Unit 6: Laboratory and field techniques

Unit 6.1 Field sampling

Unit 6.2 Laboratory analysis

Unit 6.3 Identification of macro and microorganisms

Unit 6.4 Data analysis. Use of bioindicators

7. Activities, Units/Modules and Methodology

Training Activity	Methodology	Related Competences (only degrees before RD 822/2021)	ECTS	Hours	As	Com	Description
Class Attendance (theory) [ON-SITE]	Lectures	CB03 E01 E02 E03 E04	0.84	21	N	-	Master class / Lecture
Class Attendance (practical) [ON-SITE]	Practical or hands-on activities	CB01 CB03 CB05 CB06 E01 E03 E04 E05 E06 E13 G04	0.6	15	Y	Y	Field and laboratory work. It can be submitted in spanish or english
Practicum and practical activities report writing or preparation [OFF-SITE]	Self-study	CB01 CB02 CB03 CB05 E01 E03 E04 E05 E06 E13 G03 G04	0.9	22.5	Y	Y	Writing the field and laboratory work report
Workshops or seminars [ON-SITE]	Cooperative / Collaborative Learning	CB01 CB02 E01 E03 E05 E06 E13 G01 G02 G03	0.24	6	Y	Y	Work assignments. They can be submitted in spanish or english
Writing of reports or projects [OFF-SITE]	Self-study	CB01 CB02 CB05 E01 E03 E05 E06 E13 G01 G02 G03 G04	0.64	16	Y	N	Writing the work assignments reports
Study and Exam Preparation [OFF-SITE]	Self-study	CB03 E01 E02 E03 E04 E05	1.16	29	N	-	
Progress test [ON-SITE]	Assessment tests	CB01 E01 E02 E03 E05 G03	0.04	1	Y	N	Mid-term test
Final test [ON-SITE]	Assessment tests	CB01 E01 E02 E03 E05 G03	0.08	2	Y	Y	Final test
Total:			4.5	112.5			
Total credits of in-class work: 1.8			Total class time hours: 45				
Total credits of out of class work: 2.7			Total hours of out of class work: 67.5				

As: Assessable training activity

Com: Training activity of compulsory overcoming (It will be essential to overcome both continuous and non-continuous assessment).

8. Evaluation criteria and Grading System

Evaluation System	Continuous assessment	Non-continuous evaluation*	Description
Practicum and practical activities reports assessment	25.00%	25.00%	Evaluation of the practical activities (field and lab work) report.
Final test	60.00%	75.00%	Mid-term and final test results
Other methods of assessment	15.00%	0.00%	Evaluation of work assignments
Total:	100.00%	100.00%	

According to art. 4 of the UCLM Student Evaluation Regulations, it must be provided to students who cannot regularly attend face-to-face training activities the passing of the subject, having the right (art. 12.2) to be globally graded, in 2 annual calls per subject, an ordinary and an extraordinary one (evaluating 100% of the competences).

Evaluation criteria for the final exam:

Continuous assessment:

Students who pass the mid-term test with at least 4 points (out of 10) will only have to be tested for the contents of the second half of the semester in the final test.

All evaluation activities must be passed independently with at least 4 points (out of 10). Nevertheless, students will only pass if their final mark is over 5 points, averaged over all activities according to the weights in the table above.

Non-continuous evaluation:

Only the final test (75%) and lab/field report (25%) will be considered.

All evaluation activities must be passed independently with at least 4 points (out of 10). Nevertheless, students will only pass if their final mark is over 5 points, averaged over all activities according to the weights in the table above.

Specifications for the resit/retake exam:

Those evaluation activities that were not passed (less than 4 points) will be evaluated again. The final mark must be 5 or higher.

Specifications for the second resit / retake exam:

Those evaluation activities that were not passed (less than 4 points) will be evaluated again. The final mark must be 5 or higher.

9. Assignments, course calendar and important dates	
Not related to the syllabus/contents	
Hours	hours
Practicum and practical activities report writing or preparation [AUTÓNOMA][Self-study]	22.5
Workshops or seminars [PRESENCIAL][Cooperative / Collaborative Learning]	6
Writing of reports or projects [AUTÓNOMA][Self-study]	16
Study and Exam Preparation [AUTÓNOMA][Self-study]	29
Progress test [PRESENCIAL][Assessment tests]	1
Final test [PRESENCIAL][Assessment tests]	2
Unit 1 (de 6): Introduction	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	1
Unit 2 (de 6): Abiotic factors in aquatic ecosystems	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	5
Unit 3 (de 6): Biotic communities of aquatic ecosystems	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	7
Unit 4 (de 6): Functioning of aquatic ecosystems	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Unit 5 (de 6): Main aquatic ecosystems	
Activities	Hours
Class Attendance (theory) [PRESENCIAL][Lectures]	4
Unit 6 (de 6): Laboratory and field techniques	
Activities	Hours
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	15
Global activity	
Activities	hours
Class Attendance (theory) [PRESENCIAL][Lectures]	21
Class Attendance (practical) [PRESENCIAL][Practical or hands-on activities]	15
Workshops or seminars [PRESENCIAL][Cooperative / Collaborative Learning]	6
Writing of reports or projects [AUTÓNOMA][Self-study]	16
Progress test [PRESENCIAL][Assessment tests]	1
Practicum and practical activities report writing or preparation [AUTÓNOMA][Self-study]	22.5
Study and Exam Preparation [AUTÓNOMA][Self-study]	29
Final test [PRESENCIAL][Assessment tests]	2
Total horas: 112.5	

10. Bibliography and Sources						
Author(s)	Title/Link	Publishing house	Citv	ISBN	Year	Description
Barnes & Hughes	An Introduction to Marine Ecology	Wiley-Blackwell		ISBN13: 978086542834	1999	
Levinton, J.S.	Marine Biology: function, biodiversity, ecology	Oxford University Press		0-19-508573-6	1995	
Dodds, W.K.	Freshwater Ecology	Academic press			2001	
Dodds, Walter K.	Freshwater ecology concepts and environmental applications o	Elsevier,		978-0-12-374724-2	2010	
Margalef, R.	Limnología	Omega			1983	
Mitsch W.J. & Gosselink J.G.	Wetlands	Wiley & sons			2000	
Wetzel, Robert G.	Limnology: lake and river ecosystems	Academic Press		0-12-7444760-1	2001	
Wetzel, Robert G.	Limnología	Omega		84-282-0601-5	1981	