

**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:** 2022-23**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 to thursday, 11:00 to 14:00 (contact by e-mail 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
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.
T01	To know a second foreign language.
T02	To know and apply the Information and Communication Technologies (ICT).
T03	To use a correct oral and written communication.
T04	To know the 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 E01 E03 E04 E05 E06 E13 T04	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 T03 T04	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 T01 T02 T03	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 T01 T02 T03 T04	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	-	
Mid-term test [ON-SITE]	Assessment tests	CB01 E01 E02 E03 E05 T03	0.04	1	Y	N	Mid-term test
Final test [ON-SITE]	Assessment tests	CB01 E01 E02 E03 E05 T03	0.08	2	Y	Y	Final test
<b>Total:</b>			<b>4.5</b>	<b>112.5</b>			
<b>Total credits of in-class work: 1.8</b>			<b>Total class time hours: 45</b>				
<b>Total credits of out of class work: 2.7</b>			<b>Total hours of out of class work: 67.5</b>				

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
Mid-term tests	30.00%	0.00%	Mid-term test. It will cover the first half of the theoretical contents. It can be passed with a grade of 4 (out of 10). If it is not passed, the final test will cover all the theoretical content of the subject.
Practicum and practical activities reports assessment	25.00%	25.00%	Evaluation of the report of the practical activities (field and lab work).
Other methods of assessment	15.00%	0.00%	Evaluation of work assignments
Final test	30.00%	75.00%	Final test. If the student has passed the mid-term test, it will only cover the second half of the theoretical content. If not, it will cover all of the theoretical content of the subject, in which case the value will be 60% (75% for non-continuous evaluation).
<b>Total:</b>	<b>100.00%</b>	<b>100.00%</b>	

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 will be assigned by default to the continuous evaluation program.

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:

Students will be assigned by default to the continuous evaluation program. Any student can request transfer to the non-continuous evaluation (before classes have ended) by sending an email to the professor, as long as the student has not taken part of 50% of assessable activities (classes, work assignments, etc.)

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
Mid-term 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
Mid-term 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
<b>Total horas: 112.5</b>	

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