Syllabus

Subject

Subject / Group	11676 - Marine Microbiology / 1
Degree	Master's in Marine Ecology
Credits	5
Period	2nd semester
Language of instruction	Spanish

Professors

Lecturers	Office hours for students					
	Starting time	Finishing time	Day	Start date	End date	Office / Building
Nona Sheila Agawin Romualdo nona.agawin@uib.es	You need to book a date with the professor in order to attend a tutoring session.					
Ramon Rossello Mora rossello-mora@uib.es	You need to book a date with the professor in order to attend a tutoring session.					
Eva Sintes Elvelin	You need to book a date with the professor in order to attend a tutoring session.					

Context

The ocean is composed of microorganisms, which may be difficult to see with the unaided eye, but that exist in large quantities and may represent the 98% of oceanic biomass. These small microorganisms or "microbes" include bacteria, archaea, fungi, protozoa, viruses and microalgae. Microbes are essential in the different processes (biological, geological and chemical) in the oceans.

The Marine Microbiology Course (11676) will provide knowledge about the different biogeochemical roles of microbes in the oceans, the health of ecosystems, their applied uses, their diverse habitats and how they respond to the environmental changes. The techniques on how to study them will also be presented in this subject. The subject will not enter into detail on the microalgae component because they are treated in the subject of Ecology of Phytoplankton (11673).

Apart from the list of professors, the subject has the support of Dr. Antonio Busquets Bisbal (UiB) and Victor Fernandez Juárez (UIB, for the practical part).

The subject can be taught entirely or partially in english if the students agree.

Requirements

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Recommended

Basic knowledge on microbiology is recommended.

Skills

Specific

* To know how to apply the methods and techniques of the scientific work in the marine environment, through sampling campaigns and subsequent analysis of the samples in the laboratory.
* Train to design and manage scientific projects in marine ecology.
* Train to evaluate anthropic impacts in the marine environment

Generic

* To develop the capacity to achieve a critical and self-critical attitude, both in the strictly scientific area and in other areas of application of its knowledge.
* Possess and understand knowledge that provide a basis or opportunity to be original in the development and/or application of ideas, often in a research context
* That students can apply the knowledge acquired and its capacity to resolve problems in new or relatively unknown environments and in wider contexts (or multidisciplinary)
* That the students possess the skills of learning that they allow them to keep on studying of a way that will have to be to a great extent self-guided or autonomous.

Basic

* You may consult the basic competencies students will have to achieve by the end of the Master's degree at the following address: http://estudis.uib.cat/master/comp_basiques/

Content

The subject will have both theoretical lectures and practical exercises in the laboratory.

Range of topics

Theoretical lectures. Lecture sessions in the class

1. General introduction on marine microbial ecology

2. Role of marine microbes in

* Biologeochemical processes in the oceans
* Health of ecosystems
* Marine Biotechnology

3. Response of microbes to changes in the marine environment

4. Systematics and diversity of marine microbes, cultured and uncultured

* Phylogeny
* Taxonomy
* Genomics
* Meta-genomics applied to diversity

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5. The marine microbes and their hábitats

* Benthic ecosystems
* Pelagic ecosystems (deep sea)
* Extreme habitats (halophilic microbes)

6. Techniques in the studies of marine microbial ecology

Practical exercises. Practical exercises in the laboratory/class

1. Bioinformatics
2. Molecular techniques on the study of biodiversity of marine microbes
3. Cultures

Teaching methodology

In-class work activities (1.2 credits, 30 hours)

Modality	Name	Typ. Grp.	Description	Hours
Theory classes		Large group (G)	Lectures on the various topics established in this guide, using the whiteboard or through digital presentations. Students are encouraged to participate orally by asking questions/ comments and/or answering questions posed by teachers.	25
Practical classes		Medium group (M)	Students will be taught different techniques related to the subject in the laboratory	5
Assessment		Large group (G)	Solving problems and exercises in a session of examination	0

At the beginning of the semester a schedule of the subject will be made available to students through the UIBdigital platform. The schedule shall at least include the dates when the continuing assessment tests will be conducted and the hand-in dates for the assignments. In addition, the lecturer shall inform students as to whether the subject work plan will be carried out through the schedule or through another way included in the Aula Digital platform.

Distance education tasks (3.8 credits, 95 hours)

Modality	Name	Description	Hours
Individual self-study		Understanding the theoretical concepts and the practical content of the subject, and preparation of reports.	95

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Specific risks and protective measures

The learning activities of this course do not entail specific health or safety risks for the students and therefore no special protective measures are needed.

Student learning assessment

Frau en elements d'avaluació

In accordance with article 33 of Regulation of academic studies, "regardless of the disciplinary procedure that may be followed against the offending student, the demonstrably fraudulent performance of any of the evaluation elements included in the teaching guides of the subjects will lead, at the discretion of the teacher, a undervaluation in the qualification that may involve the qualification of "suspense 0" in the annual evaluation of the subject".

Theory classes

Modality	Theory classes
Technique	Observation techniques **(non-recoverable)**
Description	Lectures on the various topics established in this guide, using the whiteboard or through digital presentations. Students are encouraged to participate orally by asking questions/comments and/or answering questions posed by teachers.
Assessment criteria	Class participation

Final grade percentage: 15%with a minimum grade of 5

Practical classes

Modality	Practical classes
Technique	Student internship dissertation **(non-recoverable)**
Description	Students will be taught different techniques related to the subject in the laboratory
Assessment criteria	Quality of explanations of the practicas exercies and interpretation of results

Final grade percentage: 35%with a minimum grade of 5

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Assessment

Modality	Assessment
Technique	Short-answer tests **(recoverable)**
Description	Solving problems and exercises in a session of examination
Assessment criteria	Answering correct answers and clarity of explanations

Final grade percentage: 50%with a minimum grade of 5

Resources, bibliography and additional documentation

Basic bibliography

1. Microbial Ecology of the Oceans 3rd Edition. 2018. Wiley Blackwell by Gasol and Kirchman (Editors)
2. Marine Microbiology, Volume 30 (Methods in Microbiology). 2001. Academic Press by Paul (Editor)
3. Handbook of Methods in Aquatic Microbial Ecology 1st Edition. 1993. CRC Pressby Paul F. Kemp (Editor), Jonathan J. Cole (Editor), Barry F. Sherr(Editor), Evelyn B. Sherr (Editor)
4. Ocean Biogeochemical Dynamics. 2006. Princeton University Press by Sarmiento and Gruber (Authors)
5. Biogeochemistry of Marine Dissolved Organic Matter, 2nd Edition. 2014. Academic Press by Hansell and Carlson (Editors)

Complementary bibliography

Literature cited:

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