



General information	
Academic subject	<i>Biology of Aquatic Plants</i>
Degree course	<i>Environmental Biology – LM6</i>
Academic Year	<i>I</i>
European Credit Transfer and Accumulation System (ECTS)	5
Language	<i>Italian</i>
Academic calendar (starting and ending date)	<i>First semester (04/10/2021-21/01/2022)</i>
Attendance	<i>Strongly recommended</i>

Professor/ Lecturer	
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Department and address	<i>Department of Biology – Plant Biology Section (2nd floor) – Campus – Via E. Orabona 4, Bari</i>
Virtual headquarters	<i>Microsoft Teams code: uzb05kf</i>
Tutoring (time and day)	Tuesdays and Wednesdays 9-11 a.m. by appointment (phone or e-mail), also on platform Microsoft Teams

Syllabus	
Learning Objectives	<i>Provide the student with in-depth skills on biological processes and investigation technologies used in the environmental ecological field, with particular reference to animal and plant biodiversity, to the biochemical, biomolecular and physiological mechanisms underlying the biological equilibrium of ecosystems and environmental protection with particular reference to marine coastal areas, including brackish and transitional environments, as well as aquaculture facilities, aquariums, parks and marine protected areas.</i>
Course prerequisites	<i>Basic knowledge of Botany</i>
Contents	<i>Contents are divided in lectures and laboratory activities and are structured as follows: Plant organisms and the aquatic environment. Phytoplankton, phytobenthos, pleuston: composition and ecological meaning. Harmful algal blooms (HABs). Toxic microalgae and main biological contaminations. Non-indigenous and invasive plant species. Mucilages and eutrophication. Fully submerged marine hydrophytes. Partially submerged marine hydrophytes: mangroves and salt marsh grasses. Endosymbiotic microalgae. Plant organisms as bioconstructors. EU legislation about waters: Water Framework Directive and Marine Strategy. Plant communities of marine coastal waters and transitional waters. Ecological status indices based on macrophytes: CARLIT, Ecological Evaluation Index, Macrophyte Quality Index, PREI Index. Sampling methodologies. Laboratory activities: application of ecological status indices based on macrophytes. Identification of the main species of marine and brackish angiosperms and seaweed. Morphometric and lepidochronological analysis of <i>Posidonia oceanica</i>.</i>
Books and bibliography	<i>G. Pasqua, G. Abate & C. Forni. Botanica generale e diversità vegetale. IV edizione. Padova: Piccin Nuova Libreria 2019. ISBN 978-88-299-2979-5.</i>
Additional materials	<i>Lacking a text which includes all the topics of the course, the teacher suggests the consultation of the above mentioned book, also providing, as a support for students, the lecture material (pdf).</i>

Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
Hours			
42	36	6	83
ECTS			
5	4.5	0.5	
Teaching strategy	<p><i>The course is structured in lectures and laboratory activities. For lectures, the teacher uses multimedia presentations, including video clips. The “flipped classroom”, when possible, is also proposed: in a preliminary phase, students can use the material provided by the teacher about specific topics of the course; using new digital devices, these topics can be analysed in depth by using web sites or scientific papers and presented to the class as interactive seminars, possibly also in English; the teacher conducts the discussion based on the material collected by students. Laboratory activities include individual and/or group work; students apply the studied methods and develop a critical analysis and self-assessment skills. The course is not delivered in e-learning mode.</i></p>		
Expected learning outcomes			
Knowledge and understanding on:	<ul style="list-style-type: none"> ○ Morphological, ultrastructural and reproductive characteristics of the main groups of aquatic plant organisms ○ Plant communities in different aquatic environments, also in relation to the influence of anthropic impact and climatic fluctuations 		
Applying knowledge and understanding on:	<ul style="list-style-type: none"> ○ To apply tools and methodological approaches in order to identify different groups of aquatic plants ○ To understand their main functions and adaptations in relation to the environment ○ To acquire tools for the conservation and management of plant communities ○ To acquire tools for the evaluation of the ecological status of water bodies using macrophytes 		
Soft skills	<ul style="list-style-type: none"> • <i>Making informed judgments and choices</i> <ul style="list-style-type: none"> ○ To recognize aquatic plant organisms ○ To analyse interactions of aquatic plants with biotic and abiotic factors ○ To interpret their responses to anthropogenic pressures • <i>Communicating knowledge and understanding</i> <ul style="list-style-type: none"> ○ To present the acquired knowledge with a vocabulary and terminology appropriate to the discipline ○ To improve the expression ability • <i>Capacities to continue learning</i> <ul style="list-style-type: none"> ○ To understand and critically discuss important aspects of the biology and ecology of aquatic plants ○ To extend autonomously the acquired knowledge by reading and understanding specific texts ○ To use the newest topics of scientific papers related to the field of interest 		
Assessment and feedback			
Methods of assessment	<p><i>The assessment of a single student is based on an oral examination that takes into account the participation in lessons and class discussions during the course. The</i></p>		



	<p><i>exam consists of a series of three to four questions that require the discussion of a topic, linked with other topics in order to evaluate the acquired knowledge, reasoning and communication skills, the ability to solve practical problems. Moreover, students have to identify some plant specimens analysed during the lab activities. For the final grade, communication skills, the ability to link different topics and to synthesize are evaluated.</i></p>
Evaluation criteria	<ul style="list-style-type: none">• Knowledge and understanding<ul style="list-style-type: none">○ To know appropriately, correctly and congruently all the topics of the course○ To know methods and techniques of identification for aquatic plants and the biodiversity of plant communities in marine and transitional environments with particular reference to the Mediterranean Sea, considering interactions with the environment• Applying knowledge and understanding<ul style="list-style-type: none">○ To identify different taxonomic groups of aquatic plants○ To apply the acquired knowledge in ecological studies• Autonomy of judgment<ul style="list-style-type: none">○ To demonstrate to have acquired the ability to interpret and critically assess experimental data and ecological implications○ To create logical connections in the exposition and consequentiality in the connection of contents○ To establish a coherent general discourse with appropriate links also with a multidisciplinary connotation• Communication skills<ul style="list-style-type: none">○ To appropriately use a specific language○ To analyse experimental data○ Synthesis ability• Capacities to continue learning<ul style="list-style-type: none">○ To discuss problems in a constructive manner○ To solve situations related to the field of aquatic plants○ To demonstrate an in-depth analysis of the issues carried out autonomously by consulting specific publications and databases.
Criteria for assessment and attribution of the final mark	<p><i>The final mark of the exam is expressed out of thirty. The exam is passed when the grade is greater than or equal to 18. Knowledge and understanding, even applied, are essential for passing the exam. The development of transversal skills related to autonomy of judgment, communication skills and capacities to continue learning allows the student to achieve a high evaluation. Honors are awarded in case of strongly positive evaluation and are decided unanimously by the Examination Commission.</i></p>
Additional information	