

General information	
Academic subject	Environmental and Applied Botany
Degree course	Land and Environmental Science and Technology
Academic Year	First year
European Credit Transfer and Accumulation System (ECTS)	9 ECTS
Language	Italian
Academic calendar (starting and ending date)	II semester (1 March - 17 June 2022)
Attendance	Recommended Attendance

Professor/ Lecturer	
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Virtual headquarters	Microsoft Teams Code: w57re8n
Tutoring (time and day)	Use email messages to establish appointments

Syllabus	
Learning Objectives	The course aims to provide knowledge on biodiversity and on the morphological and functional organization of plant organisms of agro-forestry interest, as well as on the mechanisms through which these organisms grow, reproduce and interact in the course of development.
Course prerequisites	Since this is a first-year, first-semester exam, there are no specific prerequisites different from those required for entry into the graduate program.
Contents	<p><u>Elements of General Botany</u> (16 hours = 2 ECTS). The molecular composition of plant cells: organic molecules, carbohydrates, lipids, proteins, nucleic acids, secondary metabolites. Prokaryotes and Eukaryotes. Autotrophy and Heterotrophy. The plant cell: plastids, vacuoles, cell wall. Characteristics of the secondary wall and its modifications. Functions; growth and differentiation of plant cells; meristems and plant tissues. Stem, root and leaves: morphology, anatomy and functions in Angiosperms (Monocotyledons and Dicotyledons) and Gymnosperms. Flower, fruit, seed, germination and dissemination. Absorption and transport. Mycorrhizae and Wood Wide WEB.</p> <p><u>Biochemistry and Metabolism</u> (8 hours= 1 ECTS) . Transpiration. Photosynthesis: light phase and dark phase. C4 cycle and CAM. Photorespiration. Nitrogen cycle. Plant hormones: regulatory role and general properties. Tropisms.</p> <p><u>Elements of Systematic Botany</u> (8 hours= 1 ECTS). Systematics and Taxonomy. Classification systems. Concept of species and binomial nomenclature. International code of botanical nomenclature. The classification of living things. The Fungi Kingdom. The Lichens. The great divisions of the Plant Kingdom: Thallophytes and Cormophytes: general characteristics, evolutionary importance, life cycle, ecology, distribution and applied importance. Spermatophytes: Gymnosperms and Angiosperms, their evolutionary importance and ontogenetic cycle. Systematics of the main families of agricultural and forestry interest. Botanical gardens and herbaria.</p>

	<p><u>Principles of Geobotany</u> (16 hours= 2 ECTS). Environmental factors and plant adaptations: hydrophytes, halophytes and xerophytes. Biological Forms. Chorology: areal types; geographic and taxonomic relicts; endemism; geographic and ecological vicariance. Chorotypes of the Italian flora. Naturalized, adventitious, invasive exotic plants. Biodiversity: concept and evaluation criteria; specific richness and variety, diversity gradients in space and time. IUCN Categories. Biomes. Principles and methods of vegetation study. The Braun - Blanquet phytosociological method. The dynamism of vegetation. Concepts of dynamic stage and succession. Primary and secondary successions. The concept of climax. Altitudinal zonation of vegetation: the vegetation belts in Italy.</p> <p><u>Practical activities</u> (42 hours= 3 ECTS): Observation of fresh material under optical and binocular microscope for the characterization and classification of species; observation of exsiccata and models. Techniques of preparation of a herbarium; guided visit to the Botanical Garden Museum of the University of Bari, excursions in nature.</p>
Books and bibliography	<p>LONGO C., 1986 – Biologia vegetale: Morfologia e fisiologia. UTET GEROLA F., 2006 – Biologia vegetale vol. 2 - Sistematica filogenetica. UTET. STRASBURGER E., 2007 – Trattato di botanica vol.2 - Evoluzione sistematica ed ecologia. Delfino Ed. PASQUA G., ABBATE G., FORNI C., 2011 – Botanica Generale e Diversità Vegetale. II edizione, Piccin. ARRIGONI O., 1973 – Elementi di Biologia Vegetale. Casa Editrice Ambrosiana. UBALDI D., 2003 – Flora, fitocenosi e ambiente - Elementi di geobotanica e fitosociologia, Ed. CLUEB Bologna.</p>
Additional materials	For the identification of botanical species: BARONI E.- Guida Botanica d'Italia. 1969

Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
Hours			
225	48	42	135
ECTS			
9	6	3	
Teaching strategy			
Blended learning: the topics of the course will be treated with the help of Power Point presentations, with the support of movies and practical exercises with optical and binocular microscope, guided tours and excursions. The preparation of samples and their observation will be carried out in full compliance with anti-Covid regulations.			
Expected learning outcomes			
Knowledge and understanding on:	<ul style="list-style-type: none"> ○ Knowledge of basic information about biodiversity and the morphological, functional, and physiological organization of plant organisms of agroforestry interest. ○ Knowledge of the main taxonomic categories and their phylogenetic relationships; of the mechanisms through which plant organisms reproduce and interact during development. 		
Applying knowledge and understanding on:	<ul style="list-style-type: none"> ○ Ability to apply knowledge gained from the study of plant biology with respect to morpho-functional organization, light microscopic recognition, 		

	reproductive mechanisms, botanical characteristics, and the importance of agroforestry species.
Soft skills	<ul style="list-style-type: none"> • <i>Making informed judgments and choices</i> <ul style="list-style-type: none"> ○ Ability to understand and process information acquired from the study of plant biology by evaluating its implications on the agroforestry system, with particular attention to eco-friendly and sustainable resource management. • <i>Communicating knowledge and understanding</i> <ul style="list-style-type: none"> ○ Ability to communicate effectively, orally and in writing, the knowledge acquired from the study of plant biology, even with the help of modern communication systems, Italian and a language of the European Union other than one's own, usually English. • <i>Capacities to continue learning</i> <ul style="list-style-type: none"> ○ Acquisition and ability to use the methodological tools and knowledge necessary to successfully undertake the studies foreseen in the reference Master's Degrees. The expected learning outcomes, in terms of knowledge and skills, are reported in Annex A of the Didactic Regulations of the Course of Study.

Assessment and feedback	
Methods of assessment	<p>For students enrolled in the year in which the course is held, a non-compulsory exemption test will be held. The exemption, which takes place on the dates published in the teaching calendar, consists of a written test in which the student will have two hours to answer multiple-choice and open-ended questions on topics related to the first 45 hours of the course. The result of this test will contribute to the evaluation of the final exam. For those students who have passed the exemption test, the oral test will focus only on the topics developed during the remaining 45 hours of the course. In this case, the evaluation of the exam is expressed as the average of the marks obtained in the exoneration and in the oral exam.</p> <p>Students not interested in taking the exoneration test will take the final oral exam as provided for by the Didactic Regulations of the Course of Study.</p> <p>The final exam of foreign students can be held in English.</p>
Evaluation criteria	<ul style="list-style-type: none"> • <i>Knowledge and understanding</i> <ul style="list-style-type: none"> ○ quality of theoretical knowledge possessed and adequacy of references to sources • <i>Applying knowledge and understanding</i> <ul style="list-style-type: none"> ○ ability to apply theoretical concepts to real cases ○ ability to autonomously and personally re-elaborate the learnings • <i>Autonomy of judgment</i> <ul style="list-style-type: none"> ○ Awareness of one's potential and limitations and the ability to strive for improvement. • <i>Communicating knowledge and understanding</i> <ul style="list-style-type: none"> ○ ability to communicate effectively, the knowledge acquired from the study of plant biology, even with the help of modern communication systems, Italian and a language of the European Union other than their own, usually English. • <i>Communication skills</i> <ul style="list-style-type: none"> ○ A competency in the use of specialized vocabulary and the student's

	<p>expository skills.</p> <ul style="list-style-type: none"> • <i>Capacities to continue learning</i> <ul style="list-style-type: none"> ○ Assessment of progress against baseline levels
Criteria for assessment and attribution of the final mark	<p>The exemption test, carried out in written form, consists of a test of 30 multiple-choice and open-ended questions: 1 point for each correct answer, 0 points for each wrong answer or not given. The student, who correctly answers at least 18 questions, passes the test and is "eligible". The written exemption test is passed with a grade of at least 18/30.</p> <p>The final evaluation of the exam will be expressed as an arithmetic average between the exoneration test and the final oral test. The test is passed with a grade of at least 18/30.</p> <p>Students who have not taken the exoneration test will take the final oral exam on the entire program. The test is passed with a grade of at least 18/30.</p>
Additional information	