



UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	
ACADEMIC YEAR	
ANNO ACCADEMICO EROGAZIONE	
SUBJECT	
CODE	
SCIENTIFIC SECTOR(S)	
HEAD PROFESSOR(S)	DOMINA GIANNIANTONIO Professore Associato Univ. di PALERMO
OTHER PROFESSOR(S)	
CREDITS	
PROPAEDEUTICAL SUBJECTS	
MUTUALIZATION	
YEAR	
TERM (SEMESTER)	
ATTENDANCE	
EVALUATION	
TEACHER OFFICE HOURS	DOMINA GIANNIANTONIO Tuesday 12:00 13:00 Dipartimento SAAF, viale delle Scienze, Edificio 5, primo piano, studio 121. tel. 3477027156. Wednesday 13:00 14:00 Studio 6 Marsala, via Dante Alighieri 120. tel. 3477027156. Friday 12:00 13:00 Dipartimento SAAF, viale delle Scienze, Edificio 5, primo piano, studio 121. tel. 3477027156.

PREREQUISITES	Base knowledge of Biology and General chemistry.
LEARNING OUTCOMES	<p>Knowledge and understanding Acquisition of basic knowledge about morphology, systematics and plant physiology, as well as the systematic botany. Ability to use the specific language of the basic subject, but also of the more specialized ones. Ability to approach the disciplines of the course that will take botany as a cognitive base.</p> <p>Applying knowledge and understanding Ability to recognize and make observations on Plant cytology, histology, anatomy and physiology. Ability to classify the different plant species.</p> <p>Making judgments Being able to evaluate the anomalies to normal physiological processes of the plant, the implications of cultivation on the plant; useful and harmful plants in agriculture. Being able to judge the applicability of the results of studies and publications in botany, morphological-anatomical character, as well as on plant physiology and systematic botany.</p> <p>Communication skills Ability to present the results of this subject, the principles of systematic and physiology also to an audience non-expert or expert in the field or with practical experience but with limited scientific basis.</p> <p>Learning ability Ability to understand related disciplines, as well as in-depth courses and specialized seminars of Plant Biology. Ability to understand the disciplines of the curriculum that use botany as base knowledge.</p>
ASSESSMENT METHODS	<p>In itinere written test at mid course (22 multiple choice and 2 open-ended questions) and final oral exam. For the written test the score assigned to each multiple choice question is 1, for open-ended questions is 4. In answers to open-ended questions and in the final oral exam will be valued the organic contents, the ability to make connections between topics and clarity in presentation.</p> <p>During the final oral exam students can present an educational herbarium and diagrams of the sections observed during the lab work.</p> <p>The intermediate test will weigh in the score assigned to the final test for 1/4. Positive valuation ranges from 18 to 30 and praise.</p> <p>The final valuation, properly graduated, will be formulated on the basis of the following conditions:</p> <p>a) Basic knowledge of plant biology and limited capacity to apply the gained knowledge in new situations, sufficient capacity of analysis of the studied phenomena and exposure of the procedures followed (rating 18-21);</p> <p>b) Good good knowledge of plant biology and ability to implement its content in similar situations to those studied, discrete capacity of analysis of the presented phenomena and exposure of the procedures followed (rating 22-25);</p> <p>c) In-depth knowledge of the plant biology studied and ability to apply it to the proposed biological phenomena, but not always promptly and following a linear approach, ability of identification of a higher plant of the main families studied by the use of dichotomous keys, good capacity of analysis of presented phenomena and exposition of the followe procedures (rating 26-28);</p> <p>d) deep and widespread knowledge of plant biology and ability to apply its concepts promptly and correctly, ability of identification of a higher plant with the use of dichotomous keys, excellent capacity in plant biological phenomena analysis and excellent capacity of communication (rating 29-30 and praise).</p>
EDUCATIONAL OBJECTIVES	<p>The course aims to provide basic knowledge on Plant morphology, physiology and systematics.</p> <p>Will be studied in detail various aspects of Cytology (the plant cell, the nucleus, cytoplasm, plastids, cell wall, vacuole), the Histology (meristematic tissues, medullary, mechanical, tegumental, conductors) the organography (root, stem, leaf, flower and fruit) and plant Physiology (the transport of water and other substances in the plant; hormones; energy and life processes; the role of plants in the biosphere, photosynthesis, cell respiration) will be provided with basic knowledge about systematic and taxonomy of plants, metagenetic cycles, the materials and methods of study and the basic characteristics of the major taxonomic groups. Higher plants are in-depth details studied with the main families occurring in the area.</p>
TEACHING METHODS	Lectures, technical visits, educational labs.
SUGGESTED BIBLIOGRAPHY	<p>Evert R. F. & Eichhorn S. E., 2013: Biologia delle Piante di Raven, 7° ed. – Zanichelli, Bologna.</p> <p>Arrigoni O., 1973 – Elementi di Biologia vegetale (Botanica generale). – Ambrosiana, Milano.</p> <p>Sitte P. & al.: STRASBURGER - Trattato di botanica, 10° ed. – Antonio Delfino Ed., Roma.</p>

SYLLABUS

Hrs	Frontal teaching
1	Definition, purposes, subdivisions and applications of Botany. The evolutionary changes in plants (prokaryotes, eukaryotes, thallophytes and cormophytes).
1	The cell. Morpho-functional differences between plant and animal cell. Chemical constituents of the plant cell (inorganic substances, carbohydrates, lipids, proteins, nucleic acids). Anabolism and catabolism. The nucleus. Role, structure and chemical composition. Mitosis, meiosis, mutations and genetic variability.
1	The cytoplasm. Role, structure and chemical composition. The cytoplasmic organelles (endoplasmic reticulum, Golgi apparatus, mitochondria, ribosomes, plasma membrane). The plastids. Chloroplasts: origin, role, structure and chemical composition. The proplastids and Etioplasts. The leucoplasts. The chromoplasts. The vacuole. Origin, development and function of vacuoles. The vacuolar juice. The osmotic phenomena.
1	The cell wall. Role, biogenesis and chemical composition. The middle lamella. The primary and secondary wall. Incrustations of the cell wall. Punctuations and plasmodesmata.
2	The cell aggregates. Real tissues and pseudotissues. Cell fusion (cellular thickening; middle lamella; plasmodesmata; punctuations; intercellular spaces). Meristematic or embryonic tissues: apical meristems, meristem residues, meristemoids, lateral meristems (cambi). Conducting tissues. Secretory tissues: epidermal, inner, lactiferous, nectars. Parenchymal tissues: chlorophyllous, reserve, aerial, aquifers, other parenchyma. Mechanical tissues: Collenchyma and Schlerenchyma. Tegumental tissues (or protection): epidermis stomatal openings, hairs, cork.
2	The root. Meristematic zone. Determination and differentiation zones. The primary structure zone: rizhoderis, cortex and central cylinder.
1	Secondary structure zone. Transition from the root to the stem structures. Adventitious and lateral roots.
2	The stem. Aerial and underground stems. Morphology of the Vine shoot and buds. Meristematic zone. Elongation and differentiation zone. The primary structure zone: epidermis, cortex, collenchyma, sclerenchyma, central cylinder.
1	Secondary structure zone: cambium, secondary xylem and phloem. The periderm: cork, Phellogenous and Phellogenous. The sapwood and heartwood.
2	The leaf. Ontogenesis of the leaf. Anatomy of the leaf blade (epidermis, mesophyll, the conductor system) and the petiole. Morphology and anatomy of the Vine leaf. Anatomical differences between the leaves. Heterophyllia and anisophyllia.
2	Flower and fruit. Flower and inflorescence. embryo formation and development of the seed.
1	The transport of water and other substances in the plant. Absorption of water and minerals. Water uphill and minerals. Transpiration. Relationship between transpiration and photosynthesis. Transport of substances produced from the leaves to the rest of the plant.
1	Hormones. Auxin. Gibberellins. Cinetine. Ethylene. Absciscic acid. The role of hormones in the growth and development of plants (apical dominance, the plant growth, dormancy, the abscission).
2	The role of plants in the biosphere. Energy and life processes. Photosynthesis. Plants and ecosystems.
1	Cellular respiration.
2	The plant systematic and its history. General concepts related to Systematics and Taxonomy. Classification of plants. Kingdoms Monera, Protista, Fungi and Planta. Taxonomic units. Species concepts and meaning of infraspecific taxa.
1	Botanical nomenclature. Main systems of plant classification. Artificial and natural systems.
1	The stages of phylogeny. Chronological outline of the main stages of the evolution of plants.
2	Reproduction, speciation and metagenetic cycles. Vegetative reproduction, sporogony, sexual reproduction. Metagenetic cycles of the major plant groups. The species. Phenotype and genotype. Intraspecific taxa. Speciation.
1	Prokaryotes: Generalities and Systematic. Archaea and eubacteria: Ecological, industrial, scientific, pathological interest. Systematic. Methanogenic bacteria, Halobacterium, thermophilic bacteria. Cyanobacteria.
3	Eukaryotes: Generalities and Systematic. Thallophytes Algae: Generalities. Reproducrion. Systematic. Ecology and importance. Bryophytes: Generalities and Systematic. Hepaticae, Mushi. Ecology. Fungi: Generalities and Systematic. Ecology and importance. Saprophytic and parasites fungi. Mycorrhizae. Symbiotic fungi (lichens).
2	Cormophytes Pteridophytes: Generalities and Systematic. Ecology and importance.
2	Spermatophytes: Generalities. The ovule. The seed. Systematic. Gymnosperms: vegetative and reproductive apparata. Systematics and phylogeny. Coniferophyta (Coniferopsida: major orders and families of forest interest).
2	Angiosperms: Generalities. Cycle. Evolutionary lines in the vegetative organs (growth forms, leaf nodes, conductive elements, stems). Lineages in flower. Pollination. Fertilization. Systematic. Use of analytical keys.

SYLLABUS

Hrs	Frontal teaching
3	Main families of agricultural and forest interest (Apiaceae, Asteraceae, Fabaceae, Lamiaceae, Oleaceae, Poaceae, Rosaceae, Rutaceae, Solanaceae, Vitaceae, etc.).
2	Concept of flora and vegetation and their typologies. Areal. Relationship between climate and flora: biological forms.
Hrs	Workshops
12	Plant morphology laboratory. The structures of root, leaf and stem.
Hrs	Others
10	Exercises in the classroom and in the field (technical visits) on recognition of the families of gymnosperms and angiosperms.