

LOGO DELLA STRUTTURA PRIMARIA

ACADEMIC YEAR:2018/2019			
COURSE: <b>Botany (BIO/03)</b>			
TYPE OF EDUCATIONAL ACTIVITY: Base			
TEACHER: dr. <b>Leonardo Rosati</b>			
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telefono: <b>+39 0971 205587</b>		cell. di servizio (facoltativo):	
Lingua di insegnamento: <b>Italian</b>			
<b>ECTS: 9 (8 lessons 1 practice)</b>	<b>n. of hours: 80 (64+16) (lessons and tutorials/ practice)</b>	Sede: <b>Potenza</b> Dept.: <b>SAFE</b> CdS: <b>TA</b>	<b>Semester: III Trimestre</b>
<b>EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES</b>			
<p>The course aims to acquire the basic knowledge related to botany and in particular about</p> <p>The plant cell: structures and organelles structural organization of vascular plants: histology, anatomy and functional organization; Exercises: morphological and anatomical observations of vegetative apparatus of the corm.</p> <p>Origin of Species: evolution and speciation. vegetative reproduction and sexual reproduction.</p> <p>Taxonomy and phylogeny, classification methods, the origin of eukaryotes.</p> <p>Life's cycles: characteristics and evolution.</p> <p>Morphological, structural, metabolic and ecological traits of the following taxonomic groups: Lichens; Kingdom Plantae: Bryophyte (Hepatophyta, Anthoceroophyta, Bryophyta), vascular cryptogams (Lycophyta, Sphenophyta, pterophyta), gymnosperms (Coniferophyta, Cycadophyta, Ginkgophyta, Gnetophyta), angiosperms.</p> <p>Distinctive features of the following families of angiosperms: Fagaceae, Ranunculaceae, Brassicaceae, Rosaceae, Cucurbitaceae, Solanaceae, Leguminosae, Labiatae, Malvaceae, Oleaceae, Umbelliferae, Compositae, Gramineae, Liliaceae.</p>			
<b>PRE-REQUIREMENTS</b>			
It is necessary to have acquired and assimilated the knowledge provided by the courses of "General and Inorganic Chemistry" and possess the fundamentals of biology.			
<b>SYLLABUS</b>			
<b>Part 1 (32 hours) Botany:</b>			
<p>The plant cell: membranes; specificity of the membranes; properties of the membranes; the water and the plant cells; water potential; osmosis; mitochondria; the cell wall; The wall components; growth of the wall; the median strip; the primary wall; the secondary wall; specialization of the wall; physico-chemical properties of the wall; functions of the wall; apoplastic transport and symplastic; plasmodesmata; cell separation; the vacuole; functions of the vacuole; plastids; proplastids; chloroplasts; chromoplasts; leucoplasts; photosynthetic pigments; the development cycle of plastids; origin of plastids; photosynthesis; plants C3, C4 and CAM.</p> <p>The tissues: primary and secondary meristems; cell growth and differentiation; parenchymal tissues (chlorophyll, reserve, transfusion, aquifer, auriferous, conductor); tegumental tissues (epidermis, rizhoderma, mesoderm, endoderm, cork); Mechanical tissue (collenchyma, sclerenchyma); conducting tissues ; secretory tissue (secretory hairs, salt glands, hydathode, nectars, idioblast, secretory channels, secretory pockets, lactiferous</p> <p>Organs: the stem (morphology and ontogeny); Primary structure of the stem (epidermis, cortex, stele); secondary structure; specialization and stem adaptations (reserves, support photosynthesis, defense);</p> <p>The transport of water and nutrients in the vascular system;</p> <p>the leaf, evolutionary origin, phyllotaxis, leaf morphology, anatomy (epidermis, parenchyma, conducting system; the</p>			

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genesis and development of the leaves, leaf abscission; cotyledons; leaves specialization (cirrus, thorns, the bud, succulent leaves, leaves with reserve function;

the root: the root organization, roots from the apex organization, differentiation zone; primary area, the area of secondary structure; Root specializations and adaptations, the nitrogen-fixing symbiosis;

Reproduction: vegetative reproduction; sexual reproduction; biological cycles; the structure of the flower; life cycle of angiosperms, microsporogenesis and microgametogenesis; macrosporogenesis and macrogametogenesis; pollination, incompatibility, fertilization;

The seed formation and development of the embryo, endosperm; dispersion mode; germination

The result: the formation, maturation and dispersion; Classification of fruits;

### **EXERCISES (8 hours)**

General Botany: the microscope preparation; observation and interpretation of anatomical features, histological and cell plant

### **Part 2 : Systematic Botany (32 hours):**

Origin of Species: evolution and speciation. vegetative reproduction and sexual reproduction. Taxonomy and phylogeny, classification methods, the origin of eukaryotes. The life cycles: characteristics and evolution, life cycles, morphological, structural, metabolic and ecological traits of following taxonomic groups: Lichens; Kingdom Plantae: Bryophyte (Hepatophyta, Anthoceroophyta, Bryophyta), vascular cryptogams (Lycophyta, Sphenophyta, pterophyta), gymnosperms (Coniferophyta, Cycadophyta, Ginkgophyta, Gnetophyta), angiosperms. Distinctive features of the following families of angiosperms: Fagaceae, Ranunculaceae, Brassicaceae, Rosaceae, Cucurbitaceae, Solanaceae, Leguminosae, Labiatae, Malvaceae, Oleaceae, Umbelliferae, Compositae, Gramineae, Liliaceae.

### **EXERCISES (8 hours)**

Systematic Botany: recognition of different taxa of vascular plants; use of analytical keys for determining the vascular flora at family level, genus, species. Setting up an herbarium of about 60 specimens

## TEACHING METHODS

The course amounts of 9 credits for a total of 80 hours, 64 of frontal lessons and 16 of laboratory exercises. The topics of the lessons will be presented through Power Point.

The course is organized in the following parts:

1) Frontal teaching: through the lectures the student acquires knowledge on the biology, histology, organography and systematics.

The verification of the acquisition of knowledge will be monitored through constant teacher-student interaction, and solicitation to propose topics of botany of interest of the students. During the lesson the teacher, in order to stimulate reflection, propose questions to the student that can autonomously solve on the basis of the acquired knowledge. Written tests will be possible during the course.

2) Exercises: The student with the active participation in the laboratory will learn to recognize under the light microscope some important anatomical structures at cellular, histological and organographic level. In practical laboratory exercises the student will be able to apply the knowledge acquired during the lectures. Particular importance will be given to the recognition of the main taxonomic groups treated and to the use of dichotomous keys for the determination of plant organisms.

## EVALUATION METHODS

The verification of the learning will take place through oral examination at the end of the course and will, naturally, focus on the topics covered during the course; the ability to connect and critically compare different aspects treated during the course will be evaluated. During the examination the student may be asked to recognize particular anatomical structures on microscopic and macroscopic preparations. During the examination the student must display a personal herbarium prepared according to the standard methods of scientific herbaria illustrated during

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the course and containing all the families of vascular plants of the course program, with 3-5 samples for each family. The achievement of all the previously indicated training objectives will be verified.

### TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

PASQUA G., ABBATE G., FORNI C., 2008 – *Botanica generale e diversità vegetale*” Ed. Piccin  
MARCHI P. PEPE E., BIANCHI G. *Famiglie di piante vascolari italiane 1-140*. . Casa editrice “La Sapienza”.

others

RAVEN P. H., EVERT R. F. , EICHHORN S. E., 2002 – *“Biologia delle Piante”* Ed. Zanichelli.

JUDD, CAMPBELL, KELLOGG, STEVENS, 2002 - *“BOTANICA SISTEMATICA un approccio filogenetico”* Ed. Piccin

### INTERACTION WITH STUDENTS

At the beginning of the course, after describing the objectives, program and methods of verification, the teacher provides students educational materials. Simultaneously, it collects a list of students who intend to follow the course, together with name and email.

Office hours: Wednesday from 15 to 18 at the Laboratory of Environmental and Applied Botany

In addition to weekly reception, the teacher is available at all times for a contact with the students by appointment, through the e-mail contact

### EXAMINATION SESSIONS (FORECAST)<sup>1</sup>

*04/02/2019, 11/03/2019, 15/04/2019, 20/05/2019, 17/06/2019, 22/07/2019, 22/09/2019, 21/10/2019 16/12/2019*

*N.B.: le date di esame possono subire variazioni*

SEMINARS BY EXTERNAL EXPERTS      NO

### FURTHER INFORMATION

Commissione d'esame: Leonardo Rosati, Simonetta Fascetti, Carmine Colacino