

BOTANY IN PHARMACEUTICAL SCIENCES

Code number: NP18-14

Cycle: Undergraduate

Semester: 2nd semester

Course type

X	Background/General knowledge
	Scientific area (pharmacy)

Credit Units (ECTS): 5

Lectures (hours/week): 2

Tutorial (hours/week): -

Laboratory work (hours/week): 1

Course coordinator: Kokkini Stella, Professor

Tutor (s):

Stella Kokkini, Professor

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Michael Moustakas, Professor

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Paraskevi Malea, Associate Professor

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Special Laboratory Teaching staff

Chrisa Pirini, E.E.DI.P.

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Aims of the course: Acquaintance of students with basic knowledge of plant biology: morphology, anatomy and basic function (cellular and subcellular) of plants. Main principles of plant classification. Understanding and use of scientific names. Distinction of the natural groups of medicinal plants (plants with biologically active agents), based on their morphological and chemical diagnostic features

Skills:

Use of the light microscope for observing and identifying plant cells, tissues and organs. Acquisition of skills in hand-preparing microscopic slides of plant material and interpretation of the observed image. Use of stereoscope for observation of macroscopic features that distinguish the major families of medicinal plants. Collection, taxonomic identification and preservation of plant specimens.

Teaching methods: Teaching includes hall lectures, laboratory work and fieldwork, in small groups of students.

Contents of the course:

Part A: Introduction to Plant Biology. Origin, evolution and chemical composition of plants and the uses of plants by people (nutrition, energy, medicine). The typical plant cell. Subcellular organelles and structures with emphasis on cell wall, vacuoles and plastids. The plant tissues: meristems, epidermis, periderm, parenchyma, supporting, vascular tissues and special emphasis on secretory tissues. Organization of the plant body. The stem: morphology, primary and secondary structure, modifications. The leaf: morphology, structure, growth and modifications. The root: morphology, primary and secondary structure, modifications. The flower: morphology, development, structure, pollination and fertilization. The fruit: types, development, structure. The seed: morphology, structure, formation of the embryo and endosperm, seed dispersal and germination.

Tutors: M. Moustakas, P. Malea

Part B: Historical overview of the use of medicinal plants in relation to their classification. Basic principles of scientific nomenclature and classification of plants. The "box-within-a box" method of classification. The species as a basic taxonomic unit. The distinction of plants into Divisions. The three Subdivisions of Spermatophyta. The classes and subclasses of Magnoliophytina (Angiosperms). Diagnostic morphological features of the main families of medicinal plants. Representative species of medicinal plants, their biologically active ingredients and pharmaceutical uses.

Tutors: S. Kokkini, R. Karousou, E. Chanlidou

Recommended Bibliography:

Part A.

1. Morphology and Plant Anatomy
Edition: 015/1994
Author: Stylianos G. Delivopoulos
ISBN: 960-317-015-1
Copyright: A. Simoni

2. Botany. Morphology and Anatomy of Plants
Edition: 2nd 2011
Author: Artemios Bosabalidis
ISBN: 978-960-12-2047-5
Copyright: A. Bosanalidis

Part B.

1. Systematic Botany: Phylogenetic-Phenetic Approach to Classification of Plant Organisms

Edition: 1/2004
Authors: BABALONAS D., S. KOKKINI
ISBN: 960-86090-3-8
Copyright: Charalampos NIK. AIVAZIS

Learning Activities:

Attending lectures, lab and field practice. Creation of a personal collection of dried plant specimens.

Evaluation process and methods: The students' evaluation is performed through written exams (80% of the final grade), conducted in the statutory exam periods. The written exams include two series of topics, which correspond to the two parts of the course.

PART A: The written exams includes questions: a) multiple choice, b) to which they are asked to justify the answer, c) development and d) judgment. Practical exams for laboratory exercises (10% of the final grade).

PART B: Five topics, graded according to their difficulty. An example of way they are questioned is found in e-learning.auth.gr. Oral exams, based on the dried plant specimen collection created by each student (10% of final grade). They are conducted before the written exams of each exam period. Information about date and time are given in e-learning.auth.gr

Use of TIC / Electronic distribution of the lectures

Lectures, notes, statements etc are presented in the corresponding place of e-learning.auth.gr.

Teaching: Teaching of this course is accomplished through lectures, laboratory and outdoor exercises of small groups of students.

A) Lectures. Lectures (total 13 of 2 hours each) take place in the Room I2 (main building of the Biology/Pharmacy School)

Lecture	Title	Tutor
1	Introduction to plant biology. The typical plant cell.	M. Moustakas
2	Characteristics of the plant cell with emphasis on vacuoles, cell walls and plastids.	M. Moustakas
3	Plant tissues (organization, classification). Epidermal tissue, periderm.	M. Moustakas
4	Plant tissues (organization, classification) supporting, vascular and secretory tissue. meristems.	P. Malea
5	The plant organs. The stem: External morphology - anatomical structure, modifications	P. Malea
6	The plant organs. Roots and leaves: External morphology - anatomical structure, modifications. The flower: morphology, development, structure, pollination and fertilization. The fruit: types, development, structure. The seed: morphology, structure, formation of the embryo and endosperm, seed dispersal and germination.	P. Malea

7	History and objectives of Systematic Botany – Taxonomic hierarchy – Taxonomic nomenclature. Scientific vs Common names of plants.	S. Kokkini	
8-9	Division Spermatophyta-Families of the Subdivisions Coniferophytina and Magnoliophytina. I. Class Magnoliatae, Subclasses Magnoliidae-Hamamelididae	R. Karousou	
10	Class Magnoliatae – Families of the Subclass Rosidae	R. Karousou	
11	Class Magnoliatae – Families of the Subclass Dilleniidae and Caryophyllidae	E. Hanlidou	
12	Class Magnoliatae – Families of the Subclass Asteridae	E. Hanlidou	
13	II. Class Liliatae – Families of the Subclass Liliidae	E. Hanlidou	

B)

take week

Laboratory exercises:
Laboratory exercises place once a in small groups, on

the 3rd floor of the Biology/Pharmacy School Building or in an open field. Use of light microscopes and stereoscopes. Students are required to attend all laboratory exercises (two hours/week).

Lab exercise	Title	Lecturers
1	Introduction. Use of light microscope. Form and size of plant cells. Nucleus, plastids and vacuoles.	M. Moustakas, P. Malea, C. Pirini, E. Tsakiri
2	Starch grains, protein grains and crystals. Cell wall. Epidermis, stomata, trichomes. Periderm.	M. Moustakas, P. Malea, C. Pirini, E. Tsakiri
3	Parenchyma, collenchyma, sclerenchyma. Vascular tissue, cambium. Secretory tissue.	M. Moustakas, P. Malea, C. Pirini, E. Tsakiri
4	The stem: morphology, primary and secondary structure. The leaf: morphology and structure. The root: morphology, primary and secondary structure.	M. Moustakas, P. Malea, C. Pirini, E. Tsakiri
5	How to identify the different plant groups: Key characters of Spermatophyta families I	R. Karousou, E. Hanlidou, C. Pirini, E. Tsakiri

6	How to identify the different plant groups: Key characters of Spermatophyta families II	R. Karousou, E. Hanlidou, C. Pirini, E. Tsakiri
7	Outdoor exercise: Creating a personal plant collection.	R. Karousou, E. Hanlidou, C. Pirini, E. Tsakiri