



## Course Syllabus

<b>Course Code</b>	<b>Course Title</b>	<b>ECTS Credits</b>
PHAR-360E	Φαρμακογνωσία και Χημεία Φυσικών Προϊόντων I / Pharmacognosy and Chemistry of Natural Products I	6
<b>Prerequisites</b>	<b>Department</b>	<b>Semester</b>
PHAR-151E, PHAR-120E	Life and Health Sciences	Fall/Spring
<b>Type of Course</b>	<b>Field</b>	<b>Language of Instruction</b>
Required	Pharmacy	Greek/English
<b>Level of Course</b>	<b>Lecturer(s)</b>	<b>Year of Study</b>
1 <sup>st</sup> Cycle	Dr Christos Petrou Mrs Elli Philippou (labs)	3
<b>Mode of Delivery</b>	<b>Work Placement</b>	<b>Corequisites</b>
Face-to-Face	N/A	N/A

### Course Objectives:

The course provides a brief introduction to plant systematics. Significant poisonous and medicinal plants, together with natural medicines, will be discussed. Important classes of compounds (secondary metabolites) in and from nature will be emphasised, and stress will be put on classification, nomenclature, structure, biosynthesis, occurrence, analysis and pharmaceutical perspectives. Practical exercises demonstrate different techniques within natural product chemistry.

### Learning Outcomes:

By the end of the course students will be able to:

- Identify the most important medicinal plants
- Define the crude drug and remember the most important ones
- State the phytochemical classification and memorize the main categories of active components, contained in medicinal plants
- Describe the basic methods of extracting the active components from plants and how to identify them
- Define the concepts of ethnobotany and ethnopharmacology and memorize the geographical distribution of the most important pharmaceutical plants
- Describe the quality control methods of herbal medicinal products
- Discuss about the safe use of plants for therapeutic purposes
- Report about the legislation for drugs of plant origin and know to access for information on databases of medicines Agencies

- know and be able to explain the basic principles of drug development from natural products and the role of natural products in the development and production of drugs
- know, and be able to apply the knowledge about, biosynthesis in plants – including the photosynthesis – and the formed compounds structure and classification
- have sufficient knowledge in plant morphology and plant anatomy to be able to read and understand scientific literature in pharmacognosy with scientific descriptions of plants and crude drugs
- apply the safety directions for laboratory work, keep laboratory records and carry out risk analysis
- be able to plan and carry out laboratory procedures for basic preparative extraction, isolation and identification of natural products
- know and be able to use light microscopic techniques and the preparation of microscopic slides for identification of powdered crude drugs and observation of plant anatomic features such as stomata, hairs and vascular tissue
- be able to identify a selection of the most important medicinal plants, explain their uses and account for their pharmaceutically active compounds
- be able to account for rules and legislation concerning natural remedies in an European perspective

### Course Content:

Appearance, anatomical, histochemical characteristics of each plant product, distribution in the plant, binomial botanical name of the producing plant and its family. Description of the plant and its phytogeography. Action and use of the plant products and their main active constituents. Control and assays for detecting adulteration, i.e. physical state, appearance, anatomical characteristics and chemical analysis. Emphasis will be given to plants used as crude therapeutic agents for extraction of the active material, or used as such, e.g. for obtaining anticancer, antiviral or antineurodegenerative, cardioprotective drugs.

Appearance, anatomical, histochemical characteristics of each plant product, distribution in the plant, binomial botanical name of the producing plant and its family.

- Introduction to Pharmacognosy
- Photosynthesis
- Carbohydrates and products derived from them: mono-, di- and oligo- and polysaccharides, dextrans, dextrans, starch, cellulose, gums, mucilages, antibiotics derived from carbohydrates and crude drugs containing carbohydrate based products
- Shikimic acid pathway
- Phenylpropanoids, Phenolics
- Gallic acid, lignanes, tannins
- Cinnamic acids
- Coumarines
- Flavonoids, flavanones, isoflavones, rotenoids, antocyanines,
- Pyrones
- Stilbenes
- Essential oils: isolation and quality control

**Learning Activities and Teaching Methods:**

Lectures, laboratory exercises, class discussion - tutorials

**Laboratory Sessions:**

Introduction, separation, analytical and other laboratory techniques used in pharmacognosy

Microscopic/macrosopic observation of the drug (starch, leaves, seeds, rhizomes, bark)

Carbohydrates identification

Isolation of caseine and lactose from milk

Isolation of pectin from lemon pericarp

Isolation of hesperidin from orange skin

Isolation of naringin

Isolation of eugenol from cinnamon bark

Isolation of trimyristin and myristicin from nutmeg

**Assessment Methods:**

Final exam, Midterm exam, Lab reports and exam

**Required Textbooks / Readings:**

<b>Title</b>	<b>Authors</b>	<b>Publisher</b>	<b>Year</b>	<b>ISBN</b>
Drugs of Natural Origin: A Treatise of Pharmacognosy	Gunnar Samuelsson, Lars Bohlin	Swedish Pharmaceutical Press	2011	

**Recommended Textbooks/Reading:**

<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Year</b>	<b>ISBN</b>
Medicinal Natural Products: A Biosynthetic Approach	Dewick, Paul M. Dewick ,	Hoboken, NJ, USA, 2009, ISBN:	2009	9780470742792 EBOOK
Comprehensive Bioactive Natural Products	Gupta, V.K.			EBOOK
Textbook of Pharmacognosy and Phytochemistry	Shah, Biren Seth, Avinash	Elsevier India ,	2012	EBOOK: 9788131232606
Pharmacognosy	Trease and Evans	Saunders Ltd		
Monographs on Selected Medicinal Plants	World Health Organization, WHO	World Health Organization (WHO)	2002	EBOOK 9789240681651