

## Pharmaceutical Botany

### Description

**Pharmaceutical Botany** is a fundamental discipline in the formation of future pharmacists.

The education plan provides for the course and the practical activities of Pharmaceutical Botany in the first year, assigning 3 hours of course and 3 hours of practical activities/week in the first semester and 2 hours of course and 2 hours of practical activities/week in the second semester.

The basic content of the discipline allows the pharmacy students to learn:

- general notions about the plant cell: structure, ultrastructure, cellular division;
- notions about plant histology: types of tissues, importance;
- general notions about the vegetative organs: root, stem, leaf;
- general notions about the reproduction of plants;
- the presentation of the primary plant taxons with medicinal properties that are a source of medicine for the pharmaceutical industry.

The syllabus of the Pharmaceutical Botany discipline is correlated with the curriculum of the strict specialty disciplines: pharmacognosy, toxicology, pharmacology.

The specific objectives of the discipline target the students acquiring knowledge for:

- learning the necessary notions and knowledge for the comprehension of the plant cell structure and cellular division;
- learning the necessary notions and knowledge for the comprehension of the plant tissues;
- learning the necessary notions and knowledge for the comprehension of the plant vegetative and reproductive organs;
- acquiring knowledge about plant physiology;
- learning the medicinal plants and vegetable products;
- the students' initiation in research;
- the organization of practical activities.

These objectives can be achieved by covering the informative material provided for the students: course and practical activities manuals. The theoretical botanical notions are supported by the practical activities performed in a well organized laboratory, equipped with microscopes, glassware, plant collections, seeds, fruits, anatomy kits, atlases.

The didactic activities with the students are conducted in lecture hall 210/211(Extension) and in the Pharmaceutical Botany laboratory, room 501.

The evaluation method of the students: oral practical exam and oral exam.

The collective of the discipline guides the students in developing papers presented in scientific manifestations for students and license thesis.

**Nutritional supplements** is a specialty discipline necessary for a student to become a pharmacist.

The knowledge and practical skills learned from this discipline constitute the foundation for understanding and learning plant-based medication. The students study notions about nutritional supplements, that are concentrated sources of nutrients or other substances with nutritional or physiological effect, single or in combination, commercialised in the form of dose, respectively in various forms of presentation.

The education plan provides for the optional course Nutritional supplements in the third year, first semester, assigning one hour/week.

The basic content of the discipline allows the pharmacy students to learn:

- notions and knowledge necessary for understanding the legislation concerning the rules that nutritional supplements have to follow;
- notions and knowledge useful in the recommendation of nutritional supplements in various conditions;
- the accumulation of notions regarding the therapeutical contribution of nutritional supplements;
- the classification of nutritional supplements depending on the disease;
- acquisition of knowledge regarding the recommendation of nutritional supplements depending on the disease.

The didactic activity with the students is conducted in the Pharmaceutical Botany laboratory, room 501.

**Aromatherapy** is a specialty discipline that addresses the pharmacy students in the fourth year. The education plan provides for the optional course in the fourth year, second semester, assigning one hour/week.

The Aromatherapy discipline has as an objective offering the informational support to the pharmacy students for:

- acquiring the general notions about aromatherapy;
- achieving certain skills, abilities and values useful in the pharmaceutical field;
- gaining the knowledge about the therapeutical applications of volatile oils in aromatherapy (aromatogram, mechanisms of action, administration, toxicity, precautions, contraindications).

The didactic activity with the students is conducted in the Pharmaceutical Botany laboratory, room 501.

## PHARMACEUTICAL BOTANY

### SYLLABUS

UNIVERSITY YEAR 2022- 2023

#### 1. GENERAL INFORMATION

1.1 University	UNIVERSITY OF MEDICINE AND PHARMACY OF CRAIOVA
1.2 Faculty	<b>PHARMACY</b>
1.3 Department	PHARMACY I
1.4 Bachelor field	HEALTH
1.5 Study cycle <sup>1</sup>	BACHELOR
1.6 Study programme/Qualification	PHARMACY

#### 2. STRUCTURE OF THE DISCIPLINE

2.1 Discipline name	<b>PHARMACEUTICAL BOTANY</b>						
2.2 Discipline code	FAR1103						
2.3 Head of lecture department	Cornelia Bejenaru						
2.4 Laboratory / practical classes	Antonia Radu						
2.5 Academic degree	Associate Professor PhD						
2.6 Employment (basic norm/associate)	Basic norm						
2.7 Year of study	<b>I</b>	2.8 Semester	<b>I</b> <b>II</b>	2.9 Discipline type(content) <sup>2)</sup>	<b>DF</b> <b>DF</b>	2.10 Discipline regimen (compulsoriness) <sup>3)</sup>	<b>DI</b> <b>DI</b>

#### 3. TOTAL ESTIMATED TIME (hours per semester didactical activities)

##### A. SEMESTER I

3.1 Number of hours per week	<b>6</b>	of which: 3.2 lecture	<b>3</b>	3.3 practical classes	<b>3</b>
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3.4 Total hours of didactical programme	<b>84</b>	of which: 3.5 lecture	<b>42</b>	3.6 practical classes	<b>42</b>
Time distribution					
Study after manual, textbook, bibliography and notes					<b>30</b>
Supplementary documentation in the library, on digital speciality platforms and on the field					<b>11</b>
Preparation of laboratory/practical classes, themes, portfolios and essays					<b>30</b>
Tutorship					<b>-</b>
Examinations					<b>10</b>
Other activities...consultations, student circles					<b>10</b>
3.7 Total hours of individual study					<b>91</b>
3.8 Total hours per semester					<b>175</b>
3.9 Number of credits <sup>4)</sup>					<b>7</b>

## B. SEMESTER II

3.1 Number of hours per week	<b>4</b>	of which: 3.2 lecture	<b>2</b>	3.3 practical classes	<b>2</b>
3.4 Total hours of didactical programme	<b>56</b>	of which: 3.5 lecture	<b>28</b>	3.6 practical classes	<b>28</b>
Time distribution					
Study after manual, textbook, bibliography and notes					<b>30</b>
Supplementary documentation in the library, on digital speciality platforms and on the field					<b>14</b>
Preparation of laboratory/practical classes, themes, portfolios and essays					<b>30</b>
Tutorship					<b>-</b>
Examinations					<b>10</b>
Other activities...consultations, student circles					<b>10</b>
3.7 Total hours of individual study					<b>94</b>
3.8 Total hours per semester					<b>150</b>
3.9 Number of credits <sup>4)</sup>					<b>6</b>

## 4. PRECONDITIONS (where is the case)

4.1 of curriculum	Biology
4.2 of competences	-

## 5. CONDITIONS (where is the case)

5.1. for performing the lecture	-
5.2. for performing the practical classes	Preparation, through individual study, of the laboratory

## 6. SPECIFIC ACCUMULATED COMPETENCES<sup>6/7)</sup>

<b>PROFESSIONAL COMPETENCES</b>	<p>PC1. Design, formulation, preparation and conditioning of medicines, dietary supplements, cosmetics and other health products.</p> <p>PC2. Consulting and expertise in the domain of medicines, dietary supplements, cosmetics and other health products.</p>
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<b>TRANSVERSAL COMPETENCES</b>	<b>TC1 Autonomy and responsibility</b>
	<ul style="list-style-type: none"> <li>Acquiring moral principles, developing a professional and civic attitude, which allows students to be correct, honest, nonconflicting, cooperative, willing to help people, interested in developing the community;</li> <li>To know and apply the ethical principles of medico-pharmaceutical practice;</li> <li>To identify a problem when it appears and to offer responsible solutions for its resolution.</li> </ul>
	<b>TC2 Social interaction</b>
	<ul style="list-style-type: none"> <li>To have respect for diversity and multiculturalism;</li> <li>To develop teamwork abilities;</li> <li>To communicate orally and in writing the requirements, method of work, obtained results;</li> <li>To join volunteering actions, to find out the essential problems of the community.</li> </ul>
	<b>TC3 Personal and professional development</b>
	<ul style="list-style-type: none"> <li>To open up to learning for the rest of their lives;</li> <li>To acknowledge the necessity of individual study as a personal autonomy foundation and professional development;</li> <li>To optimally and creatively value their own potential in collective activities;</li> <li>To use the information and communication technology.</li> </ul>

## 7. OBJECTIVES OF THE DISCIPLINE (from the accumulated specific competences syllabus)

7.1 General objective of the discipline	<p>The general objective of the discipline is to provide to the students from the first year the informational guidelines for:</p> <ul style="list-style-type: none"> <li>Learning the concepts and knowledge needed to understand the structure of the plant cell and cell division;</li> <li>Learning the concepts and knowledge needed to know the plant tissues;</li> <li>Understanding the concepts and knowledge needed to know the vegetative and reproductive organs of plants;</li> <li>Knowing the vegetal products.</li> </ul>
7.2 Specific objectives	<ul style="list-style-type: none"> <li>- gathering the concepts about the plant cell, plant tissues and reproduction of plants;</li> <li>- thoroughly knowing the morphology and anatomy of medicinal plants;</li> <li>- acquiring the knowledge on the physiology of plants.</li> </ul>

## 8. CONTENT OF THE DISCIPLINE

8.1 Lecture (units of content)	Nr. ore
<b>SEMESTER I</b>	
1. <u>Cytology</u> : Generalities regarding the morphology and composition of the plant cell. Living and non-living parts of the cell. Cell division.	<b>9</b>
2. <u>Histology</u> : definition, generalities. Classification of plant tissues: meristematic (original) tissues, definitive (protection, fundamental, conducting, mechanical, secretory and sensory) tissues.	<b>6</b>
3. <u>Organography</u> : 1. Root: morphology and morphological types of roots; the structure of the root apex; primary and secondary structure of the root. 2. Stem: morphology and morphological types of stems according to lifestyle; the primary and secondary structure of the stem. 3. Leaf: morphology and types of leaves, leaf anatomy.	<b>12</b>
4. <u>Plant reproduction</u> : General concepts on propagation and reproduction. Vegetative asexual and sexual propagation of plants. Flower organisation in <i>Gymnosperms</i> and <i>Angiosperms</i> . Micro- and macrosporogenesis in <i>Angiosperms</i> . Floral formula and diagrams. Inflorescences. Pollination and fecundation, formation of embryo and endosperm. The seed and fruit in <i>Angiosperms</i> . Fruit and seed propagation. Germination of seeds.	<b>9</b>

5. <b>Plant physiology:</b> Photosynthesis and chemosynthesis. Chlorophyll pigments and their role. Plant hormones and their importance in growth and development. Plant respiration and transpiration. Secondary products of the vegetal metabolism and their biogenesis.	<b>6</b>
<b>SEMESTER II</b>	
1. General considerations on the units of plant classification. Knowing the binary nomenclature and the name of vegetal medicinal products. Concept of inferior plants ( <i>Tallophyta</i> ) and superior plants ( <i>Cormophyta</i> ); the importance of knowing them medicinally.	<b>2</b>
2. Type of organisation. <b>Phyllum Bacteriophyta:</b> <i>Gram-negative</i> bacteria; <i>Gram-pozitive</i> bacteria – generalities, classification.	<b>2</b>
3. Type of organisation. <b>Phyllum Mycophyta (Fungi)</b> – generalities. <i>Mucorales</i> Order. <i>Saccharomycetales</i> Order. <i>Eurotiales</i> Order. <i>Clavicipitales</i> Order. <i>Agaricales</i> Order. Imperfect fungi	<b>2</b>
4. Type of organisation. <b>Eukaryotic algae</b> – generalities. <i>Laminariales</i> Order. <i>Fucales</i> Order. <i>Gigartinales</i> Order. <b>Phyllum Chlorophyta</b> (green algae). Type of organisation. <b>Phyllum Bryophyta (Mosses)</b> . Type of organisation. <b>Phyllum Lichenophyta (Lichens)</b>	<b>2</b>
5. Type of organisation. <b>Cormophytes. Phyllum Pteridophyta:</b> <i>Lycopodiatae</i> Class ( <i>Lycopodiopsida</i> ): <i>Lycopodiales</i> Order, <i>Selaginellales</i> Order. <i>Equisetatae</i> Class ( <i>Equisetopsida</i> ): <i>Equisetales</i> Order. <i>Polypodiatae</i> Class ( <i>Filicatae</i> , <i>Polypodiopsida</i> ): <i>Polypodiales</i> Order	<b>2</b>
6. <b>Phyllum Spermatophyta</b> – generalities; <b>Subphyllum Pinophytina</b> ( <i>Gymnospermae</i> ): <i>Ginkgoatae</i> Class ( <i>Ginkgopsida</i> ): <i>Ginkgoales</i> Order. <i>Pinatae</i> Class ( <i>Pinopsida</i> , <i>Coniferopsida</i> ): <i>Pinales</i> Order, <i>Taxales</i> Order. <i>Gnetatae</i> Class ( <i>Gnetopsida</i> ): <i>Ephedrales</i> Order.	<b>2</b>
7. <b>Subphyllum Magnoliophytina</b> ( <i>Angiospermae</i> ). <b>Magnoliatae Class</b> ( <i>Magnoliopsida</i> , <i>Dicotyledonatae</i> ). <b>Magnoliidae Subclass:</b> <i>Magnoliales</i> Order, <i>Piperales</i> Order, <i>Berberidales</i> Order, <i>Aristolochiales</i> Order, <i>Nymphaeales</i> Order, <i>Ranunculales</i> Order, <i>Papaverales</i> Order.	<b>2</b>
8. <b>Hamamelidae Subclass:</b> <i>Hamamelidales</i> Order, <i>Urticales</i> Order, <i>Juglandales</i> Order, <i>Fagales</i> Order. <b>Caryophyllidae Subclass:</b> <i>Caryophyllales</i> Order, <i>Polygonales</i> Order.	<b>2</b>
9. <b>Rosidae Subclass:</b> <i>Saxifragales</i> Order. <i>Rosales</i> Order. <i>Fabales</i> Order ( <i>Leguminosales</i> ). <i>Myrtales</i> Order. <i>Elaeagnales</i> Order. <i>Thymelaeales</i> Order, <i>Cornales</i> Order, <i>Celastrales</i> Order.	<b>2</b>
10. <b>Rosidae Subclass:</b> <i>Euphorbiales</i> Order. <i>Rhamnales</i> Order. <i>Sapindales</i> Order. <i>Rutales</i> Order. <i>Geraniales</i> Order, <i>Linales</i> Order. <i>Polygalales</i> Order. <i>Apiales</i> Order ( <i>Umbellales</i> ).	<b>2</b>
11. <b>Dilleniidae Subclass:</b> <i>Paeoniales</i> Order. <i>Theales</i> Order. <i>Malvales</i> Order. <i>Violales</i> Order. <i>Tamaricales</i> Order. <i>Capparales</i> Order ( <i>Cruciferales</i> ). <i>Salicales</i> Order. <i>Cucurbitales</i> Order. <i>Ericales</i> Order. <i>Ebenales</i> Order ( <i>Diospyrales</i> ). <i>Primulales</i> Order.	<b>2</b>
12. <b>Asteridae Subclass:</b> <i>Gentianales</i> Order, <i>Loganiales</i> Order, <i>Oleales</i> Order, <i>Polemoniales</i> Order, <i>Boraginales</i> Order, <i>Lamiales</i> Order, <i>Plantaginales</i> Order.	<b>2</b>
13. <b>Asteridae Subclass:</b> <i>Scrophulariales</i> Order ( <i>Solanales</i> ), <i>Campanulales</i> Order, <i>Rubiales</i> Order, <i>Dipsacales</i> Order, <i>Asterales</i> Order ( <i>Compositales</i> ).	<b>2</b>
14. <b>Liliatae Class</b> ( <i>Liliopsida</i> , <i>Monocotyledonatae</i> ). <b>Liliidae Subclass:</b> <i>Liliales</i> Order. <i>Orchidales</i> Order. <i>Poales</i> Order ( <i>Graminales</i> ), <i>Zingiberales</i> Order. <b>Arecidae Subclass:</b> <i>Areciales</i> Order. <i>Arales</i> Order.	<b>2</b>
<b>REFERENCES</b> Bejenaru Cornelia, Mogoşanu GD., Bejenaru LE., Popescu H. <i>Biologie vegetală. Cormobionta</i> . ediția a II-a. Ed. Sitech, Craiova, 2018. Ciocârlan V. <i>Flora ilustrată a României, Pteridophyta et Spermatophyta</i> , ediția a III-a. Ed. Ceres, București, 2009. Dinu Mihaela, Ancuceanu R. <i>Botanică farmaceutică. Histologie și Organografie. Noțiuni fundamentale</i> , Ed. Printech, București, 2016. Palade Madelena, <i>Botanică farmaceutică</i> , vol I, Ed. Tehnică, București, 1997. Palade Madelena, <i>Botanică farmaceutică</i> , vol II, Ed. Tehnică, București, 1998. Radu A., Andronescu Ecaterina, Fûzi I. <i>Botanică farmaceutică</i> , Ed. Didactică și Pedagogică, București, 1981. Sârbu i, Ștefan N, Oprea A. <i>Plante vasculare din România, Determinator ilustrat de teren</i> , Ed. Victor B Victor, București, 2013. Șerbănescu-Jitariu Gabriela, Toma C. <i>Morfologia și anatomia plantelor</i> , Ed. Didactică și Pedagogică, București, 1980. Toma C., Gostin Irina. <i>Histologie vegetală</i> , Ed. Junimea, Iași, 2000. *** <i>Flora Republicii Socialiste România</i> , XI-XIII, Edit. Acad. București, 1966-1976.	

<b>8.2 Practical classes (subjects/themes)</b>	
<b>SEMESTER I</b>	
1. Microscopic preparation technique (apparatuses, tools, reagents, ways of sectioning the vegetal material). Study of the vegetal cell as osmotic system.	3
2. Inclusions of the vacuolar juice: anthocyanin pigments and highlighting the starch grains.	3
3. Ergastic substances: aleurone, inulin grains, calcium oxalate crystals. Highlighting the chromoplasts, chloroplasts and cytoplasmic currents.	3
4. Histology: Primary protective tissues: epidermis with its annexes: stomata and tector hairs, exodermis, endodermis. Secondary protective tissues: suber and felodermis. Fundamental tissues: assimilatory parenchyma, storage parenchyma.	3
5. Mechanical tissues: colenchyma, sclerenchyma and sclereids. Conducting tissues: woody and liberian (scalariform and areolate tracheids, tracheas types). Types of conducting fascicles.	3
6. Meristematic tissues. Mitosis. Secretory tissues (glandular hairs, secretory cells, puches and secretory canals, laticifers).	3
7. External morphology of a white mustard seedling, Highlighting the area of radicular water absorption and structure of absorbing hair. Primary structure of the root in dicotyledonous compared to monocotyledonatae. Highlighting the secondary structure of the root in dicotyledonatae. Morphological types of roots.	3
8. Stem morphology. Types of buds. Primary structure of the stem in ferns.	3
9. Anatomic structure of primary stem in Monocotyledonatae and the secondary structure of the stem in Gymnospermae and Dicotyledonatae.	3
10. Morphology and anatomic structure of the leaf.	3
11. Flower morphology and types of inflorescences. Floral analysis.	3
12. Fruit morphology and types of fruit.	3
13. Seed morphology and structure.	3
14. Practical test to identify the tissues in transversal, longitudinal-radial and longitudinal-tangential sections. Recognising the types of leaves, inflorescences and fruit.	3
<b>SEMESTER II</b>	
1. <b>Phyllum Bacteriophyta:</b> Bacillus subtilis, Lactobacillus sp., Streptococcus lactis. <b>Phyllum Chlorophyta:</b> Pleurococcus vulgaris, Spirogyra sp., Cladophora glomerata. <b>Phyllum Mycophyta:</b> Mucor mucedo, Saccharomyces cerevisiae, Penicillium sp., Claviceps purpurea.	2
2. <b>Phyllum Lichenophyta:</b> Cetraria islandica, Usnea barbata, Evernia prunastri, Xanthoria parietina, Lobaria pulmonaria. <b>Phyllum Pteridophyta:</b> Fam. Lycopodiaceae: Lycopodium clavatum, L. annotinum, L. selago, Fam. Equisetaceae: Equisetum arvense, Fam. Polypodiaceae: Dryopteris filix-mas, Phyllitis scolopendrium, Polypodium vulgare. Using the guide to determine the plants.	2
3. <b>Phyllum Spermatophyta: Subphyllum Pinophytina</b> (Gymnospermae): Fam. Ginkgoaceae. Fam. Pinaceae (Abietaceae): Abies alba, Picea abies, Pinus sylvestris. Fam. Cupressaceae: Juniperus communis, Thuja orientalis. Fam. Taxaceae: Taxus baccata. Fam. Ephedraceae: Ephedra distachya.	2
4. <b>Subphyllum Magnoliophytina</b> (Angiospermae). <b>Magnoliatae</b> Class. Fam. Berberidaceae: Berberis vulgaris. Fam. Aristolochiaceae: Aristolochia clematitis, Asarum europaeum Fam. Ranunculaceae: Helleborus odoratus, H. purpurascens, Nigella sativa, Aconitum sp., Delphinium consolida, Clematis vitalba, Ranunculus sceleratus, Adonis vernalis. Fam. Papaveraceae: Papaver somniferum, P. rhoeas, Chelidonium majus. Fam. Fumariaceae: Fumaria officinalis, Corydalis cava.	2
5. Fam. Moraceae: Morus alba, Ficus carica. Fam. Cannabaceae: Cannabis sativa, Humulus lupulus. Fam. Urticaceae: Urtica dioica, U. urens. Fam. Juglandaceae: Juglans regia. Fam. Fagaceae: Fagus sylvatica, Quercus robur, Q. cerris. Fam. Betulaceae: Betula pendula, Fam. Corylaceae: Corylus avellana, Alnus glutinosa. Fam. Phytolaccaceae: Phytolacca americana. Fam. Caryophyllaceae: Saponaria officinalis, Gypsophylla paniculata. Fam. Polygonaceae: Polygonum aviculare, Rheum palmatum	2
6. Fam. Hydrangeaceae: Phyladelphus coronarius. Fam. Rosaceae: Rubus idaeus, R. caesius, Fragaria vesca, Rosa canina, Geum urbanum, Sanguisorba officinalis, Agrimonia eupatoria, Sorbus aucuparia, Crataegus sp., Prunus spinosa. Fam. Fabaceae: Sophora japonica, Glycyrrhiza glabra, Ononis spinosa, Trifolium pratense, T. repens, Robinia pseudoacacia. Fam. Lythraceae: Lythrum salicaria.	2

7. Fam. <i>Eleagnaceae</i> : Hippophaë rhamnoides. Fam. <i>Cornaceae</i> : Cornus mas. Fam. <i>Euphorbiaceae</i> : Ricinus communis. Fam. <i>Rhamnaceae</i> : Rhamnus frangula. Fam. <i>Hippocastanaceae</i> : Aesculus hippocastanum. Fam. <i>Anacardiaceae</i> : Cotinus coggygia. Fam. <i>Rutaceae</i> : Citrus limonum, Ruta graveolens. Fam. <i>Linaceae</i> : Linum usitatissimum. Fam. <i>Araliaceae</i> : Hedera helix. Fam. <i>Apiaceae</i> : Eryngium planum, E. campestre, Coriandrum sativum, Carum carvi, Pimpinella anisum, Foeniculum vulgare.	2
8. Fam. <i>Hypericaceae</i> : Hypericum perforatum. Fam. <i>Tiliaceae</i> : Tilia platyphyllos, T. tomentosa, T. cordata. Fam. <i>Malvaceae</i> : Althaea officinalis, Malva sylvestris, Hibiscus trionum. Fam. <i>Violaceae</i> : Viola odorata, V. tricolor.	2
9. Fam. <i>Brassicaceae</i> : Sinapis alba, Alliaria petiolata, Capsella bursa-pastoris, Cheiranthus cheiri. Fam. <i>Salicaceae</i> : Salix alba, Populus nigra, P. alba. Fam. <i>Ericaceae</i> : Vaccinium vitis-idaea, Vaccinium myrtillus. Fam. <i>Primulaceae</i> : Primula veris.	2
10. Fam. <i>Gentianaceae</i> : Centaurium erythraea. Fam. <i>Apocynaceae</i> : Vinca minor. Fam. <i>Oleaceae</i> : Fraxinus excelsior, F. ornus. Fam. <i>Convolvulaceae</i> : Convolvulus, arvensis. Fam. <i>Boraginaceae</i> : Pulmonaria officinalis, Symphytum officinale.	2
11. Fam. <i>Lamiaceae</i> : Lavandula angustifolia, Leonurus cardiaca, Salvia officinalis, Thymus sp., *Mentha × piperita, Origanum vulgare. Fam. <i>Plantaginaceae</i> : Plantago major, P. lanceolata. Fam. <i>Scrophulariaceae</i> : Verbascum sp., Linaria vulgaris, Digitalis purpurea, D. lanata. Fam. <i>Solanaceae</i> : Atropa belladonna, Datura stramonium. Fam. <i>Caprifoliaceae</i> : Sambucus nigra, Viburnum opulus. Fam. <i>Valerianaceae</i> : Valeriana officinalis.	2
12. Fam. <i>Asteraceae</i> : Inula helenium, Matricaria recutita, Achillea millefolium, Artemisia absinthium, Tussilago farfara, Calendula officinalis, Arctium lappa, Cynara scolymus, Silybum marianum, Centaurea cyanus, Cichorium intybus, Taraxacum officinale.	2
13. Fam. <i>Dioscoreaceae</i> : Tamus communis. Fam. <i>Liliaceae</i> : Colchicum autumnale, Convallaria majalis. Fam. <i>Poaceae</i> : Zea mays, Agropyron repens. Fam. <i>Araceae</i> : Arum maculatum.	2
14. Practical test to identify medicinal plants.	2
<b>REFERENCES</b> Andrei M., Paraschivoiu Roxana Maria. <i>Microtehnica botanică</i> , Ed. Niculescu, București, 2004. Bejenaru Cornelia, Mogoșanu GD., Bejenaru LE., Popescu H. <i>Biologie vegetală.Cormobionta</i> . ediția a II-a. Ed. Sitech, Craiova, 2018. Ciocârlan V. <i>Flora ilustrată a României, Pteridophyta et Spermatophyta</i> , ediția a III-a. Ed. Ceres, București, 2009. Palade Madelena, <i>Botanica farmaceutică</i> , vol I, Ed. Tehnică, Bucuresti, 1997. Palade Madelena, <i>Botanica farmaceutică</i> , vol II, Ed. Tehnică, Bucuresti, 1998. Sârbu i, Ștefan N, Oprea A. <i>Plante vasculare din România, Determinator ilustrat de teren</i> , Ed.Victor B Victor, București, 2013. Toma C., Rugină Rodica. <i>Anatomia plantelor medicinale</i> . Atlas, Ed. Academiei Române, București, 1998. *** <i>Flora Republicii Socialiste România</i> , XI-XIII, Edit. Acad. București, 1966-1976.	

## 9. CORROBORATION OF THE CONTENT OF THE DISCIPLINE WITH EXPECTATIONS OF THE EPISTEMIC COMMUNITY, PROFFESIONAL ASSOCIATIONS AND REPRESENTATIVE EMPLOYERS FROM THE FIELD OF THE PROGRAMME

<p>The Discipline <b>Pharmaceutical botany</b> is fundamental and mandatory for a student to become a pharmacist.</p> <p>The information and practical skills learned from this discipline offer a study basis for the processes that would be detailed at other disciplines and constitutes the foundation for understanding and learning of any plant-based medicine/dietary supplement.</p>
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### METHODOLOGICAL BENCHMARKS

<b>Forms of activity</b>	Teaching techniques / learning, materials, resources: speech, interactive lecture, teamwork, learning through exercises/projects etc.
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<b>Lecture</b>	Speech, synthesis, interactive learning for feedback purposes, explanation of any issues raised by the students. Power-point presentations, video projections.
<b>Practical classes</b>	Explanation, debate, demonstration and making fresh laboratory preparations.
<b>Individual study</b>	Bibliography study, exercises, essay preparation.

## 11. RECOVERY SCHEDULE

Recovery of absences	No. of absences that can be recovered	Place of performance	Period	Person in charge	Programming of topics
	3	Laboratory of <b>Pharmaceutical botany (room 501)</b>	Penultimate week of the semester	Proffesors of the discipline	Chronologically, according to the topics that have been missed
Consultation programme/ Scientific student circle		Laboratory of <b>Pharmaceutical botany (room 501)</b>	Monday 9 <sup>00</sup> -11 <sup>00</sup>	Proffesors of the discipline	According to students' needs
Programme for poorly trained students		Laboratory of <b>Pharmaceutical botany (room 501)</b>	Monday 11 <sup>00</sup> -13 <sup>00</sup>	Proffesors of the discipline	According to students' needs

## 12. EVALUATION

Form of activity	Evaluation			Percentage of the final grade
	<b>Formative</b>	<b>Periodical</b>	<b>Summative</b>	
<b>Lecture</b>	Oral	Oral	Oral	5%
<b>Practical classes</b>	Oral	Written	Written	10%
<b>Exam</b>			Oral	70%
<b>Periodical evaluations</b>			Written	10%
<b>Presence at the lecture</b>			Bonus	5%

## Professional counselling and guidance programs (2 hours/month)

Schedule	Place of performance	Person in charge
Last Friday of every month, between 10 <sup>00</sup> -11 <sup>00</sup>	Laboratory of <b>Pharmaceutical botany (room 501)</b>	Associate Professor PhD Cornelia Bejenaru

## NUTRITIONAL SUPPLEMENTS

University year 2022- 2023

### 1. INFORMATION ABOUT THE PROGRAM

1.1. Higher education institution	UNIVERSITY OF MEDICINE AND PHARMACY OF CRAIOVA
1.2. Faculty	<b>PHARMACY</b>
1.3. Department	PHARMACY I
1.4. Study Field	HEALTH
1.5. Study Cycle <sup>1</sup>	BACHELOR'S DEGREE
1.6. Study Program / Qualification	PHARMACY

### 2. INFORMATION ABOUT THE DISCIPLINE

2.1. Discipline name	<b>Nutritional supplements</b>
2.2. Discipline code	FAR3211

2.3. Lecture owner		Cornelia Bejenaru					
2.4. Seminar activities owner		-					
2.5. Academic degree		Associate Professor					
2.6. Employment (basic norm / associate)		Basic norm					
2.7. Study year	III	2.8. Semester	VI	2.9. Discipline type (content) <sup>2)</sup>	DF	2.10. Discipline status (compulsoriness) <sup>3)</sup>	DI

### 3. ESTIMATED TOTAL TIME (hours per semester / teaching activities)

3.1. Number of hours per week	1	from which: 3.2. lecture	1	3.3. seminar/laboratory	
3.4. Total hours of the <i>curriculum</i>	14	from which: 3.5. lecture	14	3.6. seminar/laboratory	
<b>Distribution of time content [hours]</b>					
Study after manual, lecture support, bibliography and notes					4
Additional documentation in the library, on the specialty electronic platforms and on the field					2
Training of seminars / laboratories, themes, papers, portfolios and essays					3
Tutorial					-
Examinations					1
Other activities: consultations, student's debating circles					1
3.7. Total hours of individual study					11
3.8. Total hours per semester					25
3.9. Number of credits <sup>4)</sup>					1

### 4. PRE-CONDITIONS (where applicable)

4.1. of <i>curriculum</i>	Students should have knowledge of pharmaceutical botany, anatomy, physiology, pharmacognosy, pharmacology, cellular and molecular biology.
4.2. of competencies	-

### 5. CONDITIONS (where applicable)

5.1. of lecture development	Classroom equipped with video projector / online
5.2. of seminar / laboratory development	Classroom equipped with video projector / online

### 6. ACCUMULATED SPECIFIC COMPETENCIES

<b>PROFESSIONAL COMPETENCIES</b>	<p>CP1. The designing, formulating, preparation and conditioning of medicines, nutritional supplements, cosmetics and other health products.</p> <p>CP2. Consulting and expertise in the field of medicines, nutritional supplements, cosmetics and other health products.</p>
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<b>TRANSVERSAL COMPETENCIES</b>	<p><b>CT1. Autonomy and responsibility:</b></p> <ul style="list-style-type: none"> <li>the acquisition of moral marks, the formation of professional and civic attitudes, allowing students to be correct, honest, non-conflict, cooperative, available to help people, interested in the community development;</li> <li>to know and apply the ethical principles related to the medico-pharmaceutical practice;</li> <li>to recognize a problem when it comes out and to provide solutions responsible for solving it.</li> </ul> <p><b>CT2. Social interaction:</b></p> <ul style="list-style-type: none"> <li>to have respect for diversity and multiculturalism;</li> <li>to develop team work skills;</li> <li>to communicate orally and in writing the requirements, the way of work, the results obtained;</li> <li>to engage in volunteering, to know the essential issues of the community.</li> </ul> <p><b>CT3. Personal and professional development:</b></p> <ul style="list-style-type: none"> <li>to have openness to lifelong learning;</li> <li>to become aware of the need for individual study as a basis for personal autonomy and professional development;</li> <li>to capitalize optimally and creatively their own potential in the collective activities;</li> <li>to use the information and communication technology.</li> </ul>
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#### 7. OBJECTIVES OF THE DISCIPLINE (emerging from the list of accumulated specific competencies)

7.1 General objective of the discipline	<ul style="list-style-type: none"> <li>- acquiring the information required for the knowledge of the legislation regarding the rules nutritional supplements should meet;</li> <li>- acquiring the information required for the recommendation of nutritional supplements in various diseases.</li> </ul>
7.2 Specific objectives	<ul style="list-style-type: none"> <li>- gathering the concepts concerning the therapeutic contribution of nutritional supplements.</li> <li>- knowing the nutritional supplements, depending on the disease.</li> <li>- acquiring knowledge on recommending the nutritional supplements, depending on the disease.</li> </ul>

#### 8. CONTENT OF THE DISCIPLINE

<b>8.1 Lecture (content units)</b>	<b>No. of hours</b>
1. Introductory concepts. Current legislation of nutritional supplements.	<b>1</b>
2. Nutritional supplements - ways of recommendation in therapy.	<b>1</b>
3. Nutritional supplements recommended in the therapy of the diseases in the gastrointestinal segment.	<b>1</b>
4. Nutritional supplements used as laxative-purgatives.	<b>1</b>
5. Nutritional supplements used in hepatic diseases.	<b>1</b>
6. Nutritional supplements recommended in the diseases of the urinary system.	<b>1</b>
7. Nutritional supplements used in imbalances of minerals and vitamins.	<b>1</b>
8. Nutritional supplements recommended in obesity.	<b>1</b>
9. Adjuvant nutritional supplements in arterial hypertension.	<b>1</b>
10. Nutritional supplements recommended in stimulating the immunity.	<b>1</b>
11. Nutritional supplements useful in the diseases of the nervous system.	<b>1</b>
12. Nutritional supplements recommended in dermatological cosmetics.	<b>1</b>
13. Adjuvant nutritional supplements in children's diet.	<b>1</b>
14. Adjuvant nutritional supplements in the diet of pregnant women.	<b>1</b>

## BIBLIOGRAPHY

1. Cass Hyla. *Ghidul suplimentelor nutritive în tratamentul medicamentos*. Ed. Curtea Veche Publishing, București 2013.
2. Dragomirescu Anca, Dehelean Cristina. "Nutriție și produse dietetice disponibile în farmacie" Editura Brumar, Timișoara, 2002.
3. Stroescu V., Corciovei Constantinescu Iosefina, Fulga I., Coman Oana Andreia. "Îndreptar pentru prescrierea medicamentelor" Editura ALL Educațional, București, 199.
4. Cristea Aurelia Nicoleta. "Farmacie clinică", vol I, Editura Medicală, București, 2006.
5. Mihele Denisa. "Nutriție dietoterapie și compoziția alimentelor" Editura Multi Press Internațional, București, 2004.
6. Faur Virginia. "Adevărul despre alimentație". Editura Dacia Europa Nova, Lugoj, 2002.

## 9. CORROBORATING THE CONTENT OF THE DISCIPLINE WITH THE EXPECTATIONS OF REPRESENTATIVES OF THE EPISTEMIC COMMUNITY, PROFESSIONAL ASSOCIATIONS AND REPRESENTATIVE EMPLOYERS IN THE FIELD RELATED TO THE PROGRAM

The Nutritional Supplements lecture is a fundamental discipline, mandatory for a student to become a pharmacist. The knowledge and the practical skills acquired at this discipline provide the study basis for the processes detailed at other disciplines are the foundation for the understanding and learning of any plant-based medicine or nutritional supplement.

## 10. METHODOLOGICAL BENCHMARKS

<b>Forms of activity</b>	<b>teaching / learning techniques, materials, resources: presentation, interactive lecture, group work, learning through problems / projects.</b> In special situations (alert state, emergency state, other situations that limit the physical presence of persons), the activity can also be conducted online, using informatical platforms, agreed by the faculty/university. The online educational process will be suitable adapted to provide the fulfilment of all the objectives specified in the syllabus of the discipline.
<b>Lecture</b>	Lecture, synthesis, interactive learning to obtain feedback, the explanation of problems outlined by students. <i>PowerPoint</i> presentations, movie projections. For the online version: <b>lecture, debate, problematization</b> based on the materials provided in advance.
<b>Individual study</b>	Bibliography study, exercises, essay preparation.

## 11. RECUPERATION PROGRAMME

	<b>No. of absences that can be recuperated</b>	<b>Venue</b>	<b>Period</b>	<b>Responsible</b>	<b>Themes programming</b>
Absence recuperation	3	Pharmaceutical botany lab (Room 501) / online	The last 2 weeks	Associate Professor Dr. Cornelia Bejenaru	According to the schedule of the discipline.
Consultations programme/student scientific circle	2 hours / week	Pharmaceutical botany lab (Room 501) / online	The last 2 weeks	Associate Professor Dr. Cornelia Bejenaru	According to the necessities of the students.
Programme for the poorly	4 hours / semester	Pharmaceutical botany lab (Room 501) / online	The last 2 weeks	Associate Professor Dr.	According to the schedule of the discipline.

prepared students				Cornelia Bejenaru	
12. EVALUATION					
Type of activity	Forms of evaluation		Methods of evaluation	Percentage of the final grade	
Lecture			Exam (written)/ Multiple choice test using the online informatical platform	80%	
Periodically tests				10%	
Presence at the lecture				10%	
Minimal standard of performance					
13. PROGRAMMES OF PROFESSIONAL ORIENTATION AND COUNSELING					
Programmes of professional orientation and counseling (2 hours/month)					
Scheduling hours		Venue		Responsible	
The last Friday of every month, between 12 <sup>00</sup> –14 <sup>00</sup> .		Pharmaceutical botany lab (Room 501)		Associate Professor Dr. Cornelia Bejenaru	

**SYLLABUS**  
**AROMATHERAPY**  
**University Year 2022–2023**

**1. INFORMATION ABOUT THE PROGRAM**

1.1. Higher education institution	UNIVERSITY OF MEDICINE AND PHARMACY OF CRAIOVA
1.2. Faculty	<b>PHARMACY</b>
1.3. Department	PHARMACY I
1.4. Study Field	HEALTH
1.5. Study Cycle <sup>1</sup>	BACHELOR'S DEGREE
1.6. Study Program / Qualification	PHARMACY

**2. INFORMATION ABOUT THE DISCIPLINE**

2.1. Discipline name			AROMATHERAPY				
2.2. Discipline code			FAR4211				
2.3. Lecture owner			Cornelia BEJENARU				
2.4. Seminar activities owner			—				
2.5. Academic degree			Associate Professor				
2.6. Employment (basic norm / associate)			Basic norm				
2.7. Study Year	IV	2.8. Semester	VIII	2.9. Discipline type (content) <sup>2</sup>	SD	2.10. Discipline status (compulsoriness) <sup>3</sup>	OD

**3. ESTIMATED TOTAL TIME (hours per semester / teaching activities)**

**A. VIII<sup>th</sup> SEMESTER**

3.1. Number of hours per week	<b>1</b>	from which: 3.2. lecture	<b>1</b>	3.3. seminar/laboratory	–
3.4. Total hours of the curriculum	<b>14</b>	from which: 3.5. lecture	<b>14</b>	3.6. seminar/laboratory	–
<b>Distribution of time content [hours]</b>					
Study after manual, lecture support, bibliography and notes					<b>5</b>
Additional documentation in the library, on the specialty electronic platforms and on the field					<b>3</b>
Training of seminars / laboratories, themes, papers, portfolios and essays					<b>1</b>
Tutorial					–
Examinations					<b>1</b>
Other activities: consultations, student's debating circles					<b>1</b>
3.7. Total hours of individual study					<b>11</b>
3.8. Total hours per semester					<b>25</b>
3.9. Number of credits <sup>4</sup>					<b>1</b>

#### 4. PRE-CONDITIONS (where applicable)

4.1. of curriculum	Students should have knowledge of pharmaceutical botany, anatomy, physiology, pharmacognosy, pharmacology.
4.2. of competencies	–

#### 5. CONDITIONS (where applicable)

5.1. of lecture development	Classroom equipped with video projector / online
5.2. of seminar / laboratory development	Classroom equipped with video projector / online

#### 6. ACCUMULATED SPECIFIC COMPETENCIES

<b>PROFESSIONAL COMPETENCIES</b>	<p><b>CP1.</b> Knowledge of the essential oils from pharmacological (aromatogram, mechanisms of action, mode of administration, uses) and toxicological (toxicity, precautions, contraindications) point of view.</p> <p><b>CP2.</b> Consultancy and expertise regarding the therapeutic uses of essential oils (aromatherapy).</p>
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<b>TRANSVERSAL COMPETENCIES</b>	<p><b>CT1. Autonomy and responsibility:</b></p> <ul style="list-style-type: none"> <li>the acquisition of moral marks, the formation of professional and civic attitudes, allowing students to be correct, honest, non-conflict, cooperative, available to help people, interested in the community development;</li> <li>to know and apply the ethical principles related to the medico-pharmaceutical practice;</li> <li>to recognize a problem when it comes out and to provide solutions responsible for solving it.</li> </ul> <p><b>CT2. Social interaction:</b></p> <ul style="list-style-type: none"> <li>to have respect for diversity and multiculturalism;</li> <li>to develop team work skills;</li> <li>to communicate orally and in writing the requirements, the way of work, the results obtained;</li> <li>to engage in volunteering, to know the essential issues of the community.</li> </ul> <p><b>CT3. Personal and professional development:</b></p> <ul style="list-style-type: none"> <li>to have openness to lifelong learning;</li> <li>to become aware of the need for individual study as a basis for personal autonomy and professional development;</li> <li>to capitalize optimally and creatively their own potential in the collective activities;</li> <li>to use the information and communication technology.</li> </ul>
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#### 7. OBJECTIVES OF THE DISCIPLINE (emerging from the list of accumulated specific competencies)

7.1. General objective of the discipline	<p>The objective of the discipline is to provide to the IV<sup>th</sup> Year students the informational support for:</p> <ul style="list-style-type: none"> <li>understanding the general notions regarding aromatherapy;</li> <li>acquiring of some skills, abilities, and values useful in the pharmaceutical practice.</li> </ul>
7.2. Specific objectives	<ul style="list-style-type: none"> <li>acquiring knowledge about the therapeutic uses of essential oils in aromatherapy (aromatogram, mechanisms of action, administration, toxicity, precautions, contraindications).</li> </ul>

#### 8. CONTENT OF THE DISCIPLINE

8.1. LECTURE (content units)	No. of hours
1. Aromatherapy. Definition. Short history. <i>Aetherolea</i> : extraction, storage, preservation.	1
2. <i>Aetherolea</i> : aromatogram, energetic activity (electrical referential), mechanisms of action, influence on physiological functions, chronobiology.	1
3. <i>Aetherolea</i> : modes of use, rules of administration, toxicity, precautions, contraindications.	1
4. Aromatherapy and psycho-emotional behavior. Aromatherapy for nervous system disorders.	1
5. Aromatherapy for cardiovascular disorders.	1
6. Aromatherapy for respiratory disorders.	1
7. Aromatherapy for digestive disorders.	1
8. Aromatherapy for genitourinary disorders.	1
9. Anti-infectious aromatherapy. Aromatherapy for muscular and osteoarticular disorders.	1
10. Aromatherapy for skin disorders. Aromatherapy for endocrine disorders.	1
11. Aromatherapy for pregnancy, birth and postnatal care.	1
12. Aromatherapy for newborn, infant and child.	1
13. Aromatherapy for personal and cosmetic care.	1
14. Culinary aromatherapy.	1

#### REFERENCES

<ol style="list-style-type: none"> <li>Bojor O., Popescu O., <i>Fitoterapie tradițională și modernă</i>, ediția a V-a revizuită și adăugită, Ed. Fiat Lux, București, 2009, 306–325.</li> <li>Conti Fiorella, <i>Aromaterapia: beneficiile uleiurilor esențiale</i>, Ed. Prestige, București, 2016.</li> <li>Farrer-Halls Gill, <i>Totul despre aromaterapie. Mică enciclopedie</i>, Nemira &amp; Co., București, 2008.</li> <li>Huard Danielle, <i>Uleiurile esențiale. Aromaterapia: ghid practic</i>, Ed. Paralela 45, Pitești, 2009.</li> <li>Istudor Viorica, <i>Farmacognozie. Fitochimie. Fitoterapie. Vol. II: Aetherolea, rezine, iridoide, principii amare, vitamine</i>, Ed. Medicală, București, 2001, 1–40.</li> <li>Whichello Brown Denise, <i>Aromaterapia: terapie prin uleiuri esențiale</i>, Ed. Niculescu, București, 2010.</li> </ol>
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## 9. CORROBORATING THE CONTENT OF THE DISCIPLINE WITH THE EXPECTATIONS OF REPRESENTATIVES OF THE EPISTEMIC COMMUNITY, PROFESSIONAL ASSOCIATIONS AND REPRESENTATIVE EMPLOYERS IN THE FIELD RELATED TO THE PROGRAM

The knowledge acquired in the Aromatherapy Discipline provides support for the understanding of essential oils from pharmacological (aromatogram, mechanisms of action, mode of administration, uses) and toxicological (toxicity, precautions, contraindications) point of view.

## 10. METHODOLOGICAL BENCHMARKS

<b>Forms of activity</b>	<b>Teaching / learning techniques, materials, resources: presentation, interactive lecture, group work, learning through problems / projects.</b> In special situations (alert state, emergency state, other situations that limit the physical presence of persons), the activity can also be conducted online, using informatical platforms, agreed by the faculty/university. The online educational process will be suitable adapted to provide the fulfilment of all the objectives specified in the syllabus of the discipline.
<b>Lecture</b>	Lecture, synthesis, interactive learning to obtain feedback, the explanation of problems outlined by students. <i>PowerPoint</i> presentations, movie projections. For the online version: <b>lecture, debate, problematization</b> based on the materials provided in advance.
<b>Individual study</b>	Bibliography study, exercises, essay preparation.

## 11. RECUPERATION PROGRAMME

	<b>No. of absences that can be recuperated</b>	<b>Venue</b>	<b>Period</b>	<b>Responsible</b>	<b>Themes programming</b>
Absence recuperation	3	Pharmaceutical botany lab (Room 501) / online	The last 2 weeks	Associate Professor Dr. Cornelia Bejenaru	According to the schedule of the discipline.
Consultations programme/student scientific circle	2 hours / week	Pharmaceutical botany lab (Room 501) / online	The last 2 weeks	Associate Professor Dr. Cornelia Bejenaru	According to the necessities of the students.
Programme for the poorly prepared students	4 hours / semester	Pharmaceutical botany lab (Room 501) / online	The last 2 weeks	Associate Professor Dr. Cornelia Bejenaru	According to the schedule of the discipline.

## 12. EVALUATION

<b>Type of activity</b>	<b>Forms of evaluation</b>	<b>Methods of evaluation</b>	<b>Percentage of the final grade</b>
<b>Lecture</b>		Exam (written)/ Multiple choice test using the online informatical platform	80%
<b>Periodically tests</b>			20%
<b>Presence at the lecture</b>			

<b>Minimal standard of performance</b>		
<b>Programmes of professional orientation and counseling (2 hours/month)</b>		
<b>Scheduling hours</b>	<b>Venue</b>	<b>Responsible</b>
The last Friday of every month, between 12 <sup>00</sup> –14 <sup>00</sup> .	Pharmaceutical botany lab (Room 501)	Associate Professor Dr. Cornelia Bejenaru