



PA 7.5.1 SYLLABUS

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Approved

At the Council meeting of Faculty of
Pharmacy
Minutes No. 4 of 12.06.2014

Dean of Faculty Pharmacy
PhD, associate professor

_____ N. Ciobanu

Approved

At the meeting of Pharmacognosy and
Pharmaceutical Botany Chair
Minutes No. 15 of 05.06.2014

Head of Chair,
PhD, professor

_____ A. Nistreanu

SYLLABUS FOR STUDENTS OF FACULTY OF PHARMACY

Name of the course: **PHARMACEUTICAL BOTANY**

Code of the course: **F01O005, F02O016, S02O022**

Type of course: **Compulsory**

I and II semesters, I year students

Total number of hours – 196 hours,

**including lectures - 34 hours, laboratory work - 102 hours, practical training –
60 hours.**

Number of credits provided for the course: **12, including, 6 – colloquium (I sem.); 4 – exam (II sem.); 2 – colloquium (study practice, II sem.)**

Evaluation form: **I semester – colloquium; II semester – exam; II semester - colloquium for practical training.**

Lecturers teaching the course: **Calalb Tatiana, PhD, associate professor**

Chişinău, 2014



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I. Aim of the discipline: Training of future specialists-pharmacists in the general concept of morphological and anatomical organization of plant organs and systematic affiliation of medicinal plants, skills training for morphological and anatomical analysis of herb organs.

II. Objectives obtained in teaching the discipline:

- At the level of knowledge and understanding:
 - General concept of vegetal cell structure organization;
 - Principles of histological organization vegetal organisms;
 - Morpho-anatomical particularities of vegetal organs;
 - Morphological criteria of recognition and identification of medicinal plants and their taxonomy;
 - Recognition and practical ability to determine the taxonomy of wild and cultivated plants
 - Biodiversity of wild and cultivated plants.
- At the level of application:
 - Right use of biological terminology, symbols and notions: cytological, histological, anatomical, morphological and taxonomy;
 - Description and identification of microscopic preparations; botanical images, schemes, exhibits of medicinal plants;
 - Description and identification of medicinal plant species;
 - Detection and herborization of medicinal plants;
 - Orientation in the informational data of vegetal biology and special in Pharmaceutical Botany.
 - Optimal and creative use of the individual student's potential within the practical laboratory works.
- At the level of integration:
 - Determination of Pharmaceutical Botany position and importance in all disciplines of university curriculum;
 - Concept of vegetal organisms organization, theoretical and practical knowledgex – the base to study the tollowing disciplines: Pharmaconozy, Toxic plants, Pharmacology and Phytotherapy;
 - Use of practical skills to prepare and analyse the necessary micropreparations in the pharmacognostic study of vegetable products;
 - Application of skills to highlight the morphological criteria of describtion and identification of medicinal plants;
 - Right application of scientfic nomenclature, determination of taxonomy position of spontaneous and cultivated medicinal plants.

The content: Pharmaceutical Botany is a fundamental discipline with applicative aspect that familiarizes students with fundamental principles of structural organization of plant organisms at the cellular, tissue, organ and organismal levels; help them to evidentiate morfo-anatomical indicators for medicinal plants and vegetable products identification; obtain skills for preparation and description of microscopic preparations, identification and herborizing of medicinal plants, critical thinking in addressing basic plant knowledge application in pharmacy.



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A. Lectures:

Nr.	Theme	Hours
1.	Introduction. Botany and chapters. Plant cytology. Basic notions of cell biochemistry.	2
2.	Structural organization of the plant cell. Cell diagnostic criteria to identify vegetable drugs.	2
3.	Plant histology. Classification of tissues. Role of histological criteria in identifying. Meristematic tissues. Protective tissues.	4
4.	Fundamental, mechanical, conducting and secretory tissues.	2
5.	Organography. Root and stem. Morphology and anatomy. Morphological and anatomical criteria to identify vegetable drugs. Root and stem – a source of medicine.	2
6.	Leaf. Flower. The inflorescences. Types and classification. Morphology and anatomy. Morphological and anatomical criteria to identify the vegetable drugs. Leaf and flower – a source of medicine.	2
7.	Fruit. Seed. Morphology and anatomy. Types and classification. Fruit and seed – a source of medicine.	2
8.	Systematic botany. History. Principles and systems of classification. Filum <i>Cyanophyta</i> , <i>Chlorophyta</i> , <i>Phaeophyta</i> , <i>Rhodophyta</i> , <i>Mycota</i> , <i>Lichenophyta</i> . General characteristics. Species with pharmaceutical value.	3
9.	Filum <i>Bryophyta</i> , <i>Lycopodiophyta</i> , <i>Equisetophyta</i> , <i>Polypodiophyta</i> , <i>Pinophyta</i> . General characteristics. Species with pharmaceutical value.	2
10.	Filum <i>Magnoliophyta</i> . Cl. <i>Dicotyledonatae</i> and <i>Monocotyledonatae</i> . General characteristics. Selected families: <i>Berberidaceae</i> , <i>Nymphaeaceae</i> , <i>Schisandraceae</i> , <i>Ranunculaceae</i> , <i>Papaveraceae</i> , <i>Cannabaceae</i> , <i>Urticaceae</i> , <i>Fagaceae</i> , <i>Betulaceae</i> , <i>Caryophyllaceae</i> . General characteristics. Species with pharmaceutical value.	2
11.	Families: <i>Polygonaceae</i> , <i>Grossulariaceae</i> , <i>Rosaceae</i> , <i>Fabaceae</i> . General characteristics. Species with pharmaceutical value.	2
12.	Families: <i>Myrtaceae</i> , <i>Rutaceae</i> , <i>Lythraceae</i> , <i>Onagraceae</i> , <i>Elaeagnaceae</i> , <i>Hippocastanaceae</i> , <i>Linaceae</i> , <i>Rhamnaceae</i> , <i>Euphorbiaceae</i> , <i>Loranthaceae</i> , <i>Araliaceae</i> . General characteristics. Species with pharmaceutical value.	2
13.	Families: <i>Apiaceae</i> , <i>Theaceae</i> , <i>Hypericaceae</i> , <i>Violaceae</i> , <i>Passifloraceae</i> , <i>Brassicaceae</i> , <i>Salicaceae</i> , <i>Cucurbitaceae</i> , <i>Tiliaceae</i> . General characteristics. Species with pharmaceutical value.	2
14.	Families: <i>Malvaceae</i> , <i>Ericaceae</i> , <i>Primulaceae</i> , <i>Gentianaceae</i> , <i>Apocynaceae</i> , <i>Rubiaceae</i> , <i>Caprifoliaceae</i> , <i>Valerianaceae</i> , <i>Lamiaceae</i> . General characteristics. Species with pharmaceutical value.	2
15.	Families: <i>Solanaceae</i> , <i>Scrophulariaceae</i> , <i>Plantaginaceae</i> , <i>Anacardiaceae</i> , <i>Asteraceae</i> . General characteristics. Species with pharmaceutical value.	2
16.	Class <i>Monocotyledones</i> . General characteristics. Selected families: <i>Asparagaceae</i> , <i>Liliaceae</i> , <i>Alliaceae</i> , <i>Iridaceae</i> , <i>Dioscoreaceae</i> , <i>Orchidaceae</i> , <i>Araceae</i> , <i>Poaceae</i> . General characteristics. Species with pharmaceutical value.	2
17.	Spontaneous and cultivated flora in the Republic of Moldova. Collections of medicinal plants. Ecological aspects. Protection of the local flora.	1
	TOTAL	34



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B. Practical lessons:

Nr.	Theme	Hours
1.	Technique of preparation of micropreparations and general use of reagents. Microtechnology and microscopy methods of analysis of vegetable drugs.	3
2.	Vegetal cell organization. Secondary cell wall modifications of medicinal plants.	3
3.	Plastids. Types of plastids in different organs of medicinal plants.	3
4.	Ergastic inclusions in the vegetal cell. Analysis of micropreparations of medicinal plants.	3
5.	Evaluation the theoretical and practical knowledge on "Plant cytology"	3
6.	Protective tissue. Analysis of different types of epidermal formations in medicinal plants.	3
7.	Fundamental and mechanical tissues. Analysis of different kinds of mechanical structures in medicinal plants.	3
8.	Conducting tissues. Analysis of different types of conducting structures in medicinal plants.	3
9.	Secretory tissues. Analysis of different types of secretory structures in medicinal plants.	3
10.	Evaluation of theoretical and practical knowledge on "Plant histology"	3
11.	Root. Morphology. Primary and secondary anatomy structures. Diagnostic criteria to identify vegetable drugs.	3
12.	Stem. Morphology. Primary and secondary anatomy structures. Diagnostic criteria to identify vegetable drugs.	3
13.	Leaf. Morphology and anatomy. Diagnostic criteria to identify vegetable drugs.	3
14.	Flower and inflorescences. Kinds of flowers and inflorescences of medicinal plants.	3
15.	Fruit and seed. Morphology and anatomy. Kinds of fruits of medicinal plants. Diagnostic criteria to identify vegetable drugs.	3
16.	Evaluation of theoretical and practical knowledge on "Plant organography"	3
17.	Analysis of medicinal plants on morphological and anatomical criteria.	3
18.	Structural features of some algae and fungi with pharmaceutical value.	3
19.	Structural features of some higher spore plants and gymnosperms with pharmaceutical value.	3
20.	Evaluation of knowledge on "Thallophytes, Higher spore plants and Gymnosperms".	3
21.	Morphology and anatomy features of some species with pharmaceutical value from Dicot families: <i>Berberidaceae</i> , <i>Nymphaeaceae</i> , <i>Schisandraceae</i> , <i>Ranunculaceae</i> , <i>Papaveraceae</i> .	3
22.	<i>Cannabaceae</i> , <i>Urticaceae</i> , <i>Fagaceae</i> , <i>Betulaceae</i> , <i>Caryophyllaceae</i> , <i>Polygonaceae</i> .	3
23.	<i>Grossulariaceae</i> , <i>Rosaceae</i> .	3
24.	<i>Fabaceae</i> , <i>Myrtaceae</i> , <i>Rutaceae</i> , <i>Onagraceae</i> .	3



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25.	<i>Elaeagnaceae, Hippocastanaceae, Linaceae, Rhamnaceae, Euphorbiaceae.</i>	3
26.	<i>Loranthaceae, Araliaceae, Apiaceae.</i>	3
27.	Evaluation of theoretical and practical knowledge on “Some families from dicot class”.	3
28.	<i>Theaceae, Hypericaceae, Violaceae, Passifloraceae, Brassicaceae.</i>	3
29.	<i>Salicaceae, Cucurbitaceae, Tiliaceae, Malvaceae.</i>	3
30.	<i>Ericaceae, Primulaceae, Gentianaceae, Apocynaceae, Rubiaceae, Caprifoliaceae, Valerianaceae.</i>	3
31.	<i>Lamiaceae, Solanaceae, Scrophulariaceae.</i>	3
32.	<i>Plantaginaceae, Anacardiaceae, Asteraceae.</i>	3
33.	Evaluation of theoretical and practical knowledge on “Some families from dicot class”.	3
34.	Morphology and anatomy features of some species with pharmaceutical value from Monocot families: <i>Asparagaceae, Liliaceae, Alliaceae, Iridaceae, Dioscoreaceae, Orchidaceae, Araceae, Poaceae.</i>	3

C. Practical training:

The aim: Training of future specialists-pharmacists in spontaneous and cultivated flora, development of practical skills to localization, botanical description, identification, herborization of herbs from natural and artificial biogenesis.

CONTENT AND DISTRIBUTION OF PRACTICAL ACTIVITIES PER DAYS

Nr	Theme	Number of days
1.	Familiarization with program practical of studies, with retrieval processes working in the field and the laboratory, technical security. Task-sharing of works.	1
2.	Species of plants from spontaneous and cultivated forest-park areas of Chisinau. Phenological notice, description, determination, herborization. Species of medicinal plants from filum <i>Pynophyta</i> .	1
3.	Species of medicinal plants in the field and greenhouse collections of Botany Garden (Institute) Academy of Science of Moldova.	1
4.	Species of medicinal plants in the field and greenhouse collections of Dendrological Park (Chisinau) and in the collection of medicinal and aromatic plants of the Institute of Genetics, Physiology and Plant Protection of Academy of Science of Moldova.	1
5.	Laboratory works: evaluation of Department herbarum, fixed and dried vegetable products. Working with determinations and botanical specialized literature.	1
6.	Morpho-anatomical analysis, description, determination, herborization of herbs, collecting of botanical material for drying, preserving and conservation from	3



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	collection of Centre for Cultivation of Medicinal Plants of PI SMPU "Nicolae Testemitanu" (v.Bardar. Installation and preparation of herbarum and thematic exhibits. Activities in plant collections and laboratory activities.	
7.	Morpho-anatomical analysis, botanical description, determination, herborization of plant species from the spontaneous flora of the adjacent arears of CC MP: terraced hill, forest, meadow etc.	1
8.	Final determination, installation, drawing and labeling herbarum. Closing conference. Colloquium..	1
	Total	10

Recommended literature:

A. compulsory:

1. Calalb T. Bodrug M. Botanica farmaceutică. CEP Medocina, Chişinău, 2009.
2. Tămaş M. Botanica farmaceutică. Vol. I, II, III, IV. Cluj-Napoca, Ed. Medicală Universitară „Iuliu Haţieganu”, 1991, 1999, 2002, 2004.
3. Яковлев Г., Челомбитько В. Ботаника, Москва, Изд. «Просвещение», 1990.
4. Calalb T. Indicații metodice pentru lucrări de laborator și lucru independent la Botanica farmaceutică, Chişinău, CEP „Medicina”, 2005.
5. Калалб Т. Методические указания к лабораторным занятиям и самостоятельной работе по фармацевтической ботанике, Кишинэу, CEP „Medicina”, 2004.

B. additional:

1. Oroian S., Botanica farmaceutică, Ed. Universității de Medicină și Farmacie Târgu-Mureş, 2002.
2. Palade M. Botanica farmaceutică. Vol. I, II. Bucureşti, Ed. Tehnică, 1994.
3. Гейдеман Т. Определитель высших растений Молдавской ССР. Кишинев, Изд-во «Штиинца», 1986.
4. Negru A. Determinator de plante din flora Republicii Moldova, Ed. „Universul”, Chişinău, 2007.

C. Bibliography for practical study:

1. Cartea Roşie a Republicii Moldova. Plante. Chişinău: Ştiinţa. 2001. ed. II.
2. Negru A., Şabanova G., Cantemir V., Gânju Gh., Ghendov V., Baclanov V. Plantele rare din flora spontană a Republicii Moldova. Chişinău. 2002.
3. Negru A., Ştefârță A., Cantemir V. et al. Lumea vegetală a Moldovei Vol. I-III, Chişinău, Ed. Ştiinţa. 2005, 2006.
4. Sârbu A., Smaramdache D. Îndrumător de practică botanică: munții Bucegi-Baiului, Bucureşti, Ed. Universității din Bucureşti, 2003.
5. Strategia Conservării Biodiversității Republicii Moldova, 2000.
6. Крупкина В.С. Летняя учебно-полевая практика по ботанике: методические рекомендации для преподавателей по специальности 060108 «Фармация», Красноярск, „КрасГМУ”, 2009.

Language of study:

Romanian, Russian