



PA 7.5.1 SYLLABUS

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Approved

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

Dean of Faculty of Pharmacy
PhD, associate professor

_____N. Ciobanu

Approved

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

Head of Chair,
PhD, professor

_____A. Nistreanu

SYLLABUS FOR IIIrd YEAR STUDENTS OF FACULTY OF PHARMACY

Name of the course: **PHARMACOGNOSY**

Code of the course: **S05O048, S06O057, S06O065**

Type of course: **Compulsory**

Total number of hours – 213,

lectures - 34, laboratory works - 119, practical training – 60.

Number of credits provided for the course: **10, including, 4 – colloquium (I sem.);**

4 – exam (II sem.); 2 – colloquium (study practice, II sem.)

Methods of assessment: **I semester – colloquium; II semester – exam; II semester
- colloquium for practical training.**

Lecturers teaching the course: **Cojocaru-Toma Maria, PhD, associate professor**

Chişinău, 2014



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Aim of the course: knowledge of natural product of plant origin, rare animal products, that are used as medicines or serve like source for medicine manufacturing.

Main theme of the course

Pharmacognosy course is a compulsory subject and the course material allows to study medicinal plants, plant products and active principles responsible for the action and used in pharmaceutical industry. Also, students will know the conditions of collection and storage of plants, phyto spectrum, including those registered in Moldova.

A. Lectures:

No.	Theme	h
1.	Pharmacognosy as a subject. Definition. Tasks, relationship with other disciplines. Analysis of vegetable products. Classification of medicinal plants and vegetable products (VP). Documental analytical standardization of VP. Polyholosides. Definition. Spread. Biosynthesis. Chemical structure. Classification. Plants and VP containing polyholosides: brown algae, flax, marshmallow, mallow forest, linden, mullein, plantain, coltsfoot.	2
2.	Vitamine. Definition. Nomenclature and classification. Chemical structure, spread and use. Particularities of drying and storage of vegetable products. Plants and VP containing vitamins: marigold, three-lobe beggarticks, mountain ash, sea buckthorn, nettle, corn, shepherds-purse, guelder rose, rosehip, blueberry.	2
3.	Terpenoids. Definition. Classification. Biosynthesis. Volatile oils. Definition. Classification. Spread, localization. Collection and analysis of essential oils. Plants and VP containing acyclic terpenoids: rose, coriander, lavender, lemon balm. Plants and VP containing monocyclic terpenoids: peppermint, sage, eucalyptus, caraway, lemon, pyrethrum. Plants and VP containing bicyclic monoterpenoids: juniper, tansy, valerian, hyssop. Sources of camphor - pine.	2
4.	Plants and VP containing sesciterpenoide: calamus, common birch, elecampane, chamomile, milfoil, mountain arnica, black poplar. Plants and VP containing aromatic terpenoids: anise, fennel, common thyme, breckland thyme, origanum, asarabacca, basil. Resinous substances. Definition. Classification. Spread. Products containing resinous substances: turpentine, oil of turpentine, rosin. Plants and VP containing resins: hop, field bindweed. Bitter substances. Definition. Spread. Chemical composition. Classification. Dosage. Use. VP and plants containing bitter substances: gentian, centaury, buckbean, dandelion, benedicts thistle, wormwood, horehound.	2
5.	Alkaloids. Definition. History. Classification. Spread. Biosynthesis of tropane alkaloids. Collection, drying and storage of plants and VP containing alkaloids. VP and plants containing pyrrolizidine alkaloids: comfrey, eastern groundsel. Plants and VP containing alkaloids and derivatives of coniine: hemlock; VP containing alkaloids and derivatives of nicotine: tobacco; VP and plants containing tropane alkaloids: mandragora, henbane, henbane bell, jimson weed, thorn-apple.	2
6.	Plants and VP containing chynolizidinice alkaloids: japanese pagoda tree, false lupine, water lily. Plants and VP containing isoquinoline alkaloids: poppy garden, celandine, yellow poppy, barberry, plume poppy, ungermia.	2
7.	VP and plants containing indole alkaloids: claviceps purpurea, rauvolfie, madagascar periwinkle, passiflora. Plants and VP containing purine alkaloids: chinese tea, cocoa, coffee tree; alkaloids terpenoids: larkspur, wolfsbane; steroidal alkaloids: poroporo, false helleborine; alkaloids acyclic: ephedra sinica, pepper, autumn crocus.	2



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8.	Heterosides cardiac. Definition. Chemical structure. Classification. Spread. Dynamics of accumulation. Collection and preservation of VP. Biological standardization. Use. Plants and VP containing cardiac heterosides: foxglove, woolly foxglove, strofantus, false hellebore, lily-of-the-valley, mixandra.	2
9.	Saponosides. Definition. Classification. Spread. Use. Plants and VP containing saponosides: liquorice, Jacob's Ladder, cowslip, soapwort, common horsetail, chestnut, aralia, ginseng, java tea, dioscorea, smooth rupturewort, flat sea holly.	2
10.	Phenolic compounds. Definition. Classification. Biosynthesis. Simple phenols and their heterozidele. Classification. Plants and VP containing fenolheterozide: kinnikinnick, lingonberry. Fluorocarbons. Classification. Plants and VP containing phloroglucinol: fern, golden root. Lignans. VP and plants containing lignans: five flavor berry, Mayapple.	2
11.	Anthracene derivatives and their heterosides. Definition. Classification. Spread location. Use. VP and plants containing derivatives of anthracene: buckthorn, waythorn, turkish rhubarb, asiatic dock, senna, aloe, dyer's madder, st. Johns wort.	2
12.	Flavonoids. Definition. Classification. Spread. Use. VP and plants containing flavonoids: garden cornflower, hawthorn, golden chain, buckwheat, throw-wort, water-pepper, spotted ladysthumb, knotgrass.	2
13.	VP and plants containing following flavonoids: black chokeberry, baikal skullcap, dwarf everlast, spiny restharrow. Medicinal species. Nomenclature official species. Analysis use.	2
14.	Coumarin and cromone. Definition. Classification. Spread, localization. Use. Plants and VP containing coumarins and cromones: yellow sweet clover, ami (majus), ami (visnaga), parsnip, garden angelica, dill.	2
15.	Tannins. Definition. Classification. Spread, collection. Use. VP and plants containing tannins: sumac, smoke tree, oak, bistort, great burnet, germander, badan, alder, bilberry, lingonberry, hamamelis, common bennet.	2
16.	Plants and PP with different active principles. mistletoe, kalanchoe, raspberry tree, peony, pumpkin, fig, thistle, meadow sweet, vinaria, beans, wild strawberry.	2
17.	History of use and study of flora and medicinal plants in Moldova. Environmental protection and rational use of natural resources. Analysis of pharmacognostical plant products.	2
	Total	34

B. Laboratory works:

No.	Theme	Hours
1.	Learning of methods of pharmacognostic analysis of vegetable products (VP) of different morphological groups.	3
2.	Chemical analysis of vegetable products (VP), of different groups of active principles.	3
3.	Analysis of VP containing polyholosides.	3
4.	Analysis of VP containing vitamins.	3
5.	Test paper: Plants and VP containing polyholosides and vitamins.	3



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6.	Analysis of VP crumbled after determination.	3
7.	Analysis of VP containing volatile oils (acyclic monoterpenoids and monocyclic).	3
8.	Analysis of VP containing volatile oils (bicyclic monoterpenoids and sesquiterpenoids).	3
9.	Analysis of VP containing volatile oils (sesquiterpenoids and aromatics).	3
10.	Chemical analysis of VP containing volatile oils.	3
11.	Analysis of VP containing bitter and resinous substances.	3
12.	Test paper: Plants and VP containing volatile oils, bitter and resinous substances.	3
13.	Analysis of VP containing alkaloids (pyrrolizidine and tropane).	3
14.	Analysis of VP containing alkaloids (chynolizidine, isoquinoline and indole).	3
15.	Analysis of VP containing alkaloids (purine, terpenoid, steroid and acyclic side chain nitrogen).	3
16.	Chemical analysis of VP containing alkaloids.	3
17.	Test paper: Plants and VP containing alkaloids.	3
18.	Analysis of VP containing cardiac heterosides.	4
19.	Analysis of VP containing saponosides.	4
20.	Chemical analysis of VP containing cardiac heterosides and saponosides.	4
21.	Test paper: Plants and VP containing cardiac heterosides and saponosides.	4
22.	Analysis of VP containing phenolic compounds.	4
23.	Analysis of VP containing anthracene derivatives.	4
24.	Chemical analysis of the VP content anthracene derivatives.	4
25.	Analysis of VP containing flavonoids.	4
26.	Chemical analysis of VP containing flavonoids.	4
27.	Test paper: Plants and VP containing phenolic compounds, anthracene derivatives and flavonoids.	4
28.	Analysis of medicinal species.	4
29.	Analysis of VP containing coumarins and cromone.	4
30.	Analysis of VP containing tannins.	4
31.	Chemical analysis of VP containing coumarins and tannins.	4



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32.	Chemical analysis of VP containing various active principles.	4
33.	Test paper: Plants and VP containing coumarins, tannins and various active principles.	4
34.	Analysis of pharmacognosy.	4
	Total	119

C. Practical lessons:

The aim: Deepening and improvement of theoretical knowledge and professional ethics rules, learned during courses and laboratory works, practical skills training, identification, collection, processing and storage of plant products based on rational use of medicinal plants.

Content and distribution of practical activities per days

No.	Thematic practical activity	Number of days
1.	Learning with the base of practice, calendar schedule and safety instruction technique program.	3
2.	Meeting of wild medicinal plants in different biocenosis	12
3.	Determination, morfological characteristics and herborization of plant products	12
4.	Determination of resources of spontaneous medicinal plants	12
5.	Techniques and methods of organization of collection of plant products (recollection, drying and primary processing)	6
6.	Methods and technologies of cultivation of medicinal plants	6
7.	Rules, conditions and processing of plant products	6
8.	Test	3
	Total	60

Recommended literature:

A. Compulsory:

1. Farmacognozie. Nistreanu A. Chişinău, 2001.
2. Lucrări practice la farmacognozie. Dolgova, E. Ladâghina. Chişinău, Universitas, 1995.
3. Analiza chimică a plantelor medicinale. Chişinău, Universitas, 1993.
4. Фармакогнозия. Муравьева Д.А. Москва, «Медицина», 1991.
5. Фармакогнозия (атлас) под ред. Н.И. Гринкевич, Е. Ладыгиной. Москва. «Медицина», 1989.
6. Химический анализ лекарственных растений. под ред. Гринкевич Н.И., Софронич Л.Н. М., «Высшая школа», 1983.
7. Руководство к практическим занятиям по фармакогнозии. Долгова А.А., Ладыгина Е. И. М., «Медицина», 1977.

B. Additional:

1. Farmacopeea europeană. 2008, 2009.
2. Farmacopeea română, ediția X. Editura medicală, București, 1993.
3. Ghid farmacoterapeutic. Matcovschi C., Safta V. Editura „Vector”. Chişinău, 2010.
4. Farmacognozie. Fitochimie. Fitoterapie. Istudor V. Vol. I, II, III. Editura Medicală,



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București, 1998, 2001, 2005.

5. Государственная Фармакопея. XI издание. Москва. «Медицина», том 1, 1987 и том 2, 1990.
6. Государственная Фармакопея Республики Беларусь. Том II, 2007, Том III, 2009.
7. Лекарственные средства. Машковский М.Д. Москва. «Новая волна», 2005.

C. Bibliography for practical lessons:

1. Farmacognozie. Grigorescu E., Stănescu U. Iași, Volum I; II; III.
2. Cartea Roșie a Republicii Moldova. Plante. Chișinău: Știința. 2001. ed. II.
3. Negru A., Șabanova G., Cantemir V., Gânju Gh., Ghendov V., Baclanov V. Plantele rare din flora spontană a Republicii Moldova. Chișinău. 2002.
4. Negru A., Ștefăriță A., Cantemir V. et al. Lumea vegetală a Moldovei Vol. I-III, Chișinău, Ed. Știința. 2005, 2006.
5. Teleuță A., Colțun M., Plante medicinale, Chișinău, 2010.
6. WHO Monographs on medicinal plants commonly used in the Newly Independent States (NIS), World Health Organization, Geneva, 2010.

Language of study:

Romanian.