

SYLLABUS

PHARMACOGNOSY–PHYTOTHERAPY

1. INFORMATION ABOUT PROGRAM

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

2. INFORMATION ABOUT DISCIPLINE

2.1. Discipline name	PHARMACOGNOSY–PHYTOTHERAPY						
2.2. Discipline code	FAR3205						
2.3. Lecture owners	Ludovic Everard BEJENARU / George Dan MOGOȘANU						
2.4. Laboratory activity owners	Andrei BIȚĂ						
2.5. Academic degrees	Associate Professor / Associate Professor / Lecturer						
2.6. Employment (basic norm / associate)	Basic norm: V th Semester / VI th Semester / V th Semester & VI th Semester						
2.7. Study Year	III	2.8. Semester	V VI	2.9. Discipline type (content) ²	SD SD	2.10. Discipline status (compulsoriness) ³	ComD ComD

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

A. Vth SEMESTER

3.1. Number of hours per week	6	from which: 3.2. lecture	3	3.3. seminar/laboratory	3
3.4. Total hours of the curriculum	84	from which: 3.5. lecture	42	3.6. seminar/laboratory	42
Distribution of time content [hours]:					
Study after manual, lecture support, bibliography and notes					25
Additional documentation in the library, on the specialty electronic platforms and on the field					10
Training of seminars / laboratories, themes, papers, portfolios and essays					18
Tutorial					–
Examinations					10
Other activities: consultations, student's debating circles					28
3.7. Total hours of individual study					91
3.8. Total hours per semester					175
3.9. Number of credits ⁴					7

B. VIth SEMESTER

3.1. Number of hours per week	6	from which: 3.2. lecture	3	3.3. seminar/laboratory	3
3.4. Total hours of the curriculum	84	from which: 3.5. lecture	42	3.6. seminar/laboratory	42
Distribution of time content [hours]:					
Study after manual, lecture support, bibliography and notes					12
Additional documentation in the library, on the specialty electronic platforms and on the field					5
Training of seminars / laboratories, themes, papers, portfolios and essays					5
Tutorial					–
Examinations					5
Other activities: consultations, student's debating circles					14
3.7. Total hours of individual study					41
3.8. Total hours per semester					125
3.9. Number of credits ⁴					5

4. PRE-CONDITIONS (where applicable)

4.1. of curriculum	Students should have knowledge of pharmaceutical botany, cell biology, anatomy, physiology, organic chemistry.
4.2. of competencies	–

5. CONDITIONS (where applicable)

5.1. of lecture development	Lecture room with means of projection / online environment.
5.2. of seminar / laboratory development	Practical works room / online environment.

6. ACCUMULATED SPECIFIC COMPETENCIES

PROFESSIONAL COMPETENCIES	CP1. Analysis and control of natural medicinal products, food supplements, cosmetics and other health products; analysis in the laboratories for the control of natural drug (general pharmacognostic analysis). CP2. Consulting and expertise in the field of natural medicines, food supplements, cosmetics and other health products.
TRANSVERSAL COMPETENCIES	CT1. Autonomy and responsibility: - 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; - to know and apply the ethical principles related to the medico-pharmaceutical practice; - to recognize a problem when it comes out and to provide solutions responsible for solving it. CT2. Social interaction: - to have respect for diversity and multiculturalism; - to develop team work skills; - to communicate orally and in writing the requirements, the way of work, the results obtained; - to engage in volunteering, to know the essential issues of the community. CT3. Personal and professional development: - to have openness to lifelong learning; - to become aware of the need for individual study as a basis for personal autonomy and professional development; - to capitalize optimally and creatively their own potential in the collective activities; - to use the information and communication technology.

7. OBJECTIVES OF THE DISCIPLINE (emerging from the list of accumulated specific competencies)

7.1. General objective of the discipline	The objective of the discipline is to provide to the IIIrd Year students the informational support for: - understanding of the notions and knowledge about plant and animal raw materials, in terms of origin, distribution, methods of production, chemical composition (active principles), pharmacological action, transformation in the pharmaceutical forms and therapeutic indications; - understanding basic notions and knowledge about phytotherapy; - acquiring of some skills, abilities and values useful in the pharmaceutical practice.
7.2. Specific objectives	- acquiring knowledge about plant and animal raw materials of medicinal interest; - acquiring knowledge about the use of plants and herbal extracts as medicines; - understanding the importance of pharmacognosy and phytotherapy in pharmaceutical practice.

8. CONTENT

8.1. LECTURE (content units)

Vth SEMESTER	No. of hours
1. General Pharmacognosy (5 hours):	
1. 1. Definition, content and place between the pharmaceutical sciences. The natural medicine. General history of natural medicine, pharmacognosy and phytotherapy. History of natural medicine and pharmacognosy in Romania.	1
1. 2. Natural raw materials. Active principles. Sources of medicinal raw materials. Vegetal kingdom. Spontaneous plants. Cultivated plants. Improvement. Pharmaceutical biotechnology. Cell and tissue cultures. Genetic engineering. Animal kingdom.	1
1. 3. Life, metabolism, photosynthesis. Primary and secondary biosynthetic pathways of autotrophic plants. Photosynthesis. Biosynthesis (biogenesis) of active principles. Fundamental and secondary substances. Active principles, medicines. Methods for elucidating biosynthesis.	1
1. 4. Obtaining, processing, conditioning, storage, and preservation of medicinal herbal products. Harvesting. Transport. Cleaning. Selection. Shaping. Stabilization. Fermentation. Drying. Lyophilization. Conditioning. Packaging. Marking. Storage. Preservation.	1
1. 5. Legislation on poisonous plant products. Regime of narcotic vegetal products. Production, quality control and research of natural raw materials of medicinal use. Classification of natural medicinal raw materials.	1

8.1. LECTURE (content units)	
2. Special Pharmacognosy (37 hours):	
2. 1. Carbohydrates. Background. Simple carbohydrates, sugar alcohols (polyols) and sugar acids: Mel, Manna. Homogeneous polysaccharides: Amylum, Dextranum 40, Dextranum 70, Lentinan, Ganoderma, Graminis rhizoma. Heteroglycans (heteropolysaccharides, polyuronides). Pectins. Gums: Gummi arabicum, Tragacantha, Xanthani gummi, Guar galactomannan, Sterculiae gummi, Ceratoniae gummi. Mucilages: Agar, Carrageen, Laminariae stipes, Lini semen, Psyllii semen, Althaeae radix, Althaeae folium, Malvae folium, Malvae flos, Tiliae flos, Verbasci flos, Plantaginis folium, Farfarae folium et flos, Heparinum natricum.	8
2. 2. Lipids. Background. Raw materials with lipids used in pharmaceutical technology: Helianthi oleum, Olivae oleum, Amygdali oleum, Arachidis oleum, Sesami oleum, Palm oil, Cocos oleum, Arganiae oleum, Cacao oleum, Stearinum, Adeps suillus, Adeps lanae (anhydricus, hydrosus), Cetaceum, Cera flava, Cera carnauba, Cera jojoba. Raw materials with pharmacologically active lipids: Lini oleum, Jecoris oleum, Hydnocarpi oleum, Ricini oleum, Crotonis oleum, Oenotherae oleum, Lecithinum, Sojae oleum.	3
2. 3. Nitrogen compounds. Background. Alkaloids. Background. True alkaloids. Piperidine alkaloids: Lobeliae herba, Granati cortex, Arecae semen. Tropane alkaloids: Belladonnae radix, Belladonnae folium, Hyoscyami folium, Hyoscyami mutici semen, Stramonii folium, Mandragorae radix, Scopoliae rhizoma, Daturae innoxiae herba, Duboisiae folium, Cocae folium. Indole alkaloids: Avenae herba, Avenae fructus, Physostigmae semen, Passiflorae herba, Secale cornutum, Uncariae cortex, Rauwolfiae radix, Yohimbe cortex, Vincae minoris herba, Catharanthi herba et radix, Strychni semen. Isoquinoline alkaloids: Opium, Papaveris (immaturi) fructus, Hydrastidis rhizoma, Curara, Berberidis cortex, Chelidonii herba, Chelidonii radix, Fumariae herba, Boldi folium, Ipecacuanhae radix. Quinoline alkaloids: Cinchonae cortex. Quinolizidine alkaloids: Cytisi semen, Sarothamni herba. Imidazole alkaloids: Jaborandi folium. Purine alkaloids: Coffeae semen, Colae semen, Cacao semen, Theae folium, Mate herba, Guarana. Pseudoalkaloids. Diterpene alkaloids: Aconiti tuber. Sterol alkaloids: Solani laciniati herba, Veratri rhizoma. Protoalkaloids: Ephedrae herba, Cathae folium, Colchici semen et bulbos, Capsici fructus. Protids. Venoms: Snake venom, Bee venom. Lectins. Background. Visci folium cum stipes. Pharmacologically inactive protids: Gelatina.	16
2. 4. Heterosides (glycosides). Background. Cyanogenic glycosides. Background. Sambuci flos, Amygdali semen. Thioglycosides (glucosinolates). Background. Sinapis nigrae semen, Sinapis aetheroleum, Erucae semen. Alliins. Background. Allii sativi bulbos, Allii cepae bulbos, Allii ursini bulbos et folium.	2
2. 5. Aromatic compounds. Background. Phenyl derivatives. Background. Uvae-ursi folium, Vitis idaeae folium. Phenylmethane derivatives. Background. Salicis cortex, Filipendulae ulmariae herba. Phenyl-propane derivatives. Background. Cynarae folium, Silybi mariani fructus. Benzopyran derivatives. Background. Coumarins: Meliloti herba, Meliloti flos, Fraxini cortex, Fraxini folium, Ammi majoris fructus. Chromones: Ammi visnagae fructus. Flavonoids. Background. Alchemillae herba, Cerasorum stipes, Crataegi folium cum flore, Crataegi fructus, Sophorae flos, Fagopyri herba, Taraxaci officinalis herba cum radice, Propolis, Populi gemma, Ginkgonis folium, Polygoni avicularis herba, Viola herba cum flore, Orthosiphonis folium, Myrtilli fructus, Ribes nigri fructus, Hibisci sabdariffae flos, Cyani flos.	8
VIth SEMESTER	No. of hours
2. Special Pharmacognosy, continuation (37 hours):	
2. 6. Aromatic compounds. Lignans. Background. Podophylli rhizoma, Podophylli resina, Bardanae radix. Tannins. Background. Gallic tannins: Gallae turcicae, Gallae sinensis, Hamamelidis folium, Lythri herba, Anserinae herba. Catechic tannins: Ratanhiae radix, Gei rhizoma, Agrimoniae herba. Mixed tannins: Querci cortex, Bistortae rhizoma, Tormentillae rhizoma. Phloroglucinol derivatives. Background. Lupuli flos, Lupulinum, Filicis rhizoma, Kousso flos, Kamala. Anthracene derivatives. Background. Rhei rhizoma, Frangulae cortex, Sennae folium, Sennae fructus, Aloe, Rhamni purshianae cortex, Chrysarobinum, Hyperici herba, Rubiae radix, Morindae fructus, Coccionella.	6
2. 7. Isoprenoids (terpenoids). Background.	1
2. 7. 1. Atypical monoterpenoids (iridoids). Background. Valerianae rhizoma cum radicibus, Leonuri cardiacae herba, Harpagophyti radix, Oleae folium, Gentianae radix, Centaurii herba, Menyanthidis trifoliatae folium, Verbenae herba, Agni casti fructus, Pyrethri flos, Cantharis.	2
2. 7. 2. Cardiac glycosides. Background. Digitalis purpureae folium, Digitalis lanatae folium, Strophanthi semen, Convallariae herba, Adonidis herba, Hellebori rhizoma, Scillae bulbos.	3
2. 7. 3. Steroids. Natural sterols of medicinal interest. Background. Pruni africanae cortex, Sabalis serrulatae fructus, Cucurbitae semen. Spirosterane (steroidal) saponins. Background. Trigonellae foenum-graeci semen, Rusci rhizoma. Triterpenoid saponins. Background. Ginseng radix, Eleutherococci radix, Liquiritiae radix, Primulae rhizoma cum radicibus, Saponariae radix,	6

8.1. LECTURE (content units)	
<i>Polygalae radix, Centellae asiaticae herba, Solidaginis virgaureae herba, Ononidis radix, Equiseti herba, Betulae folium, Hederae folium, Hippocastani semen.</i>	
2. 7. 4. Carotenoids. Background. <i>Calendulae flos, Croci stigma, Tagetes flos, Urticae folium, Urticae radix.</i>	2
2. 7. 5. Essential oils. Background. <u>Monoterpenes</u> : <i>Lavandulae flos et aetheroleum, Bergamotae aetheroleum, Coriandri fructus et aetheroleum, Melissae folium et aetheroleum, Citronellae aetheroleum, Aurantii pericarpium et aetheroleum, Citri pericarpium et aetheroleum, Menthae folium, herba et aetheroleum, Carvi fructus et aetheroleum, Eucalypti folium et aetheroleum, Niaouli aetheroleum, Cajeputi aetheroleum, Rosmarini folium et aetheroleum, Chenopodii aetheroleum, Thymi herba et aetheroleum, Serpylli herba, Origani herba, Arnicae flos, Angelicae radix, Angelicae fructus, Salviae officinalis folium, Terebinthinae aetheroleum, Pini montanae aetheroleum, Juniperi fructus et aetheroleum, Hyssopi herba.</i> <u>Sesquiterpenes</u> : <i>Chamomillae flos et aetheroleum, Chamomillae romanae flos, Millefolii flos, herba et aetheroleum, Absinthii herba, Inulae radix, Echinaceae radix, Echinaceae herba, Zingiberis rhizoma et aetheroleum.</i> <u>Aromatic derivatives</u> : <i>Cinnamomi cortex et aetheroleum, Caryophylli flos et aetheroleum, Anisi vulgaris fructus et aetheroleum, Anisi stellati fructus, Foeniculi fructus et aetheroleum, Calami rhizoma.</i>	12
2. 7. 6. Resins and balsams. Background. <u>True resins</u> : <i>Colophonium.</i> <u>Oleo-resins</u> : <i>Terebinthina communis.</i> <u>Balsams</u> : <i>Balsamum Peruvianum, Balsamum Tolutanum, Benzoe.</i>	2
2. 8. Tars. Background. <i>Pix liquida, Pix cadi, Pix lithanthracis, Ichthammolum.</i>	1
2. 9. Varia: <i>Rosae pseudo-fructus, Hippophaë fructus, Maydis stigma, Symphyti radix, Phaseoli pericarpium, Galegae herba, Bursae-pastoris herba, Xanthii spinosi herba, Ballotae nigrae herba, Levistici radix.</i>	2
3. Special Phytotherapy (5 hours):	
3. 1. Products with action on the vegetative nervous system and the neuromotor unit. Products with action on the central and peripheral nervous system.	1
3. 2. Products with action on the cardiovascular system. Products with action on the respiratory system.	1
3. 3. Products with action on the digestive system and its annexes. Products acting on the excretory system.	1
3. 4. Products with action on the cutaneous system. Active products by the content of vitamins or mineral salts.	1
3. 5. Possible contraindications and incidents in phytotherapy. Phytotherapy in relation to legislation.	1

REFERENCES

1. Bejenaru L. E., Mogoșanu G. D., Bejenaru Cornelia, Popescu H. (2015) <i>Farmacognozie-Fitoterapie. Vol. I</i> , Colecția „Pharmakon”, Ed. SITECH, Craiova.
2. Bojor O., Popescu O. (2009) <i>Fitoterapie tradițională și modernă</i> , ediția a V-a revizuită și adăugită, Ed. Fiat LUX, București.
3. Bruneton J. (2016) <i>Pharmacognosie. Phytochimie. Plantes médicinales</i> , 5 ^e édition, revue et augmentée, Lavoisier TEC & DOC, Paris.
4. Ciulei I., Grigorescu Em., Stănescu Ursula. (1993) <i>Plante medicinale. Fitochimie și Fitoterapie</i> , vol. I, II, Ed. Medicală, București.
5. Hanganu Daniela. (2005) <i>Farmacognozie. Materii prime naturale cu compuși aromatici</i> , Ed. Medicală Universitară „Iuliu Hațieganu”, Cluj-Napoca.
6. Istudor Viorica. (1998, 2001, 2005) <i>Farmacognozie, Fitochimie, Fitoterapie</i> , vol. I, II, III, Ed. Medicală, București.
7. Mogoșanu G. D., Bejenaru L. E., Bejenaru Cornelia, Popescu H. (2015) <i>Farmacognozie-Fitoterapie. Vol. II</i> , Colecția „Pharmakon”, Ed. SITECH, Craiova.
8. Oniga Ilioara. (2007) <i>Farmacognozie. Compuși terpenici naturali</i> , Ed. Medicală Universitară „Iuliu Hațieganu”, Cluj-Napoca.

8.2. LABORATORY ACTIVITIES / PRACTICAL WORKS (subjects / themes)	
Vth SEMESTER	No. of hours
1. General rules of labor protection in physico-chemical analysis laboratories. General pharmacognostic analysis. Establishing the identity and purity of natural medicinal products by macroscopic, microscopic and microchemical methods. Establishing the quality of natural medicinal products by identifying, separating and quantifying the active principles.	3
2. Carbohydrates. Background. Simple carbohydrates, sugar alcohols (polyols) and sugar acids: <i>Mel, Manna.</i> Homogeneous polysaccharides: <i>Amylum, Dextranum 40, Dextranum 70, Graminis rhizoma.</i>	3
3. Heteroglycans (heteropolysaccharides, polyuronides). <u>Gums:</u> <i>Gummi arabicum, Tragacantha.</i> <u>Mucilages:</u> <i>Agar, Carrageen, Laminariae stipes, Lini semen, Althaeae radix, Althaeae folium, Malvae folium, Malvae flos, Tiliae flos, Verbasci flos, Plantaginis folium, Farfarae folium et flos.</i>	3
4. Lipids. Background. Raw materials with lipids used in pharmaceutical technology: <i>Helianthi oleum, Olivae oleum, Arganiae oleum, Cacao oleum, Stearinum, Adeps suillus, Adeps lanae (anhydricus, hydrosus), Cetaceum, Cera flava.</i> Raw materials with pharmacologically active lipids: <i>Lini oleum, Jecoris oleum, Ricini oleum, Lecithinum, Sojae oleum.</i>	3

8.2. LABORATORY ACTIVITIES / PRACTICAL WORKS (subjects / themes)	
5. Alkaloids. Background. Piperidine alkaloids: Lobeliae herba, Granati cortex. Tropane alkaloids: Belladonnae radix, Belladonnae folium, Hyoscyami folium, Stramonii folium, Scopoliae rhizoma, Daturae innoxiae herba, Coccae folium.	3
6. Indole alkaloids: Avenae herba, Avenae fructus, Physostigmae semen, Passiflorae herba, Secale cornutum, Rauwolfiae radix, Vincae minoris herba, Strychni semen.	3
7. Isoquinoline alkaloids: Opium, Papaveris (immaturi) fructus, Hydrastidis rhizoma, Berberidis cortex, Chelidonii herba, Chelidonii radix, Boldi folium, Ipecacuanhae radix.	3
8. Quinoline alkaloids: Cinchonae cortex. Quinolizidine alkaloids: Cytisi semen, Sarothamni herba. Imidazole alkaloids: Jaborandi folium. Purine alkaloids: Coffeae semen, Colae semen, Cacao semen, Theae folium.	3
9. Pseudoalkaloids. Diterpene alkaloids: Aconiti tuber. Sterol alkaloids: Solani laciniati herba, Veratri rhizoma. Protoalkaloids: Ephedrae herba, Capsici fructus, Colchici semen. Lectins: Visci folium cum stipes. Heterosides (glycosides). Background. Cyanogenic glycosides: Sambuci flos, Amygdali semen. Thioglycosides (glucosinolates, sulphur compounds): Sinapis nigrae semen, Sinapis aetheroleum, Erucae semen.	3
10. Aromatic compounds. Background. Phenyl derivatives: Uvae-ursi folium, Vitis idaeae folium, Myrtilli folium. Phenylmethane derivatives: Salicis cortex, Filipendulae ulmariae herba, Vanilla fructus. Phenylpropane derivatives: Cynarae folium, Silybi mariani fructus.	3
11. Benzopyran derivatives. Coumarins: Meliloti herba, Meliloti flos, Fraxini cortex, Fraxini folium, Ammi majoris fructus. Chromones: Ammi visnagae fructus.	3
12. Flavonoids: Alchemillae herba, Cerasorum stipes, Crataegi folium cum flore, Crataegi fructus, Sophorae flos, Fagopyri herba, Taraxaci officinalis herba cum radice, Propolis, Populi gemma, Ginkgonis folium, Viola herba cum flore, Myrtilli fructus, Rhoeados flos, Cyani flos.	3
13. Global chemical analysis of the studied active principles: extraction, separation, identification.	3
14. Practical test of macroscopic, microscopic and phytochemical analysis.	3
VIth SEMESTER	No. of hours
1. Lignans: Podophylli rhizoma, Podophylli resina, Bardanae radix. Tannins. Gallic tannins: Gallae turcicae, Gallae sinensis, Hamamelidis folium, Lythri herba, Anserinae herba. Catechic tannins: Ratanhiae radix, Gei rhizoma, Agrimoniae herba. Mixed tannins: Querci cortex, Bistortae rhizoma, Tormentiallae rhizoma.	3
2. Phloroglucinol derivatives: Lupuli flos, Lupulinum, Filicis rhizoma. Anthracene derivatives: Rhei rhizoma, Frangulae cortex, Sennae folium, Sennae fructus, Aloe, Rhamni catharticae fructus, Rumicis radix, Hyperici herba, Rubiae radix, Coccionella.	3
3. Isoprenoids (terpenoids). Background. Atypical monoterpenoids (iridoids): Valerianae rhizoma cum radicibus, Leonuri cardiaca herba, Oleae folium, Gentianae radix, Centaurii herba, Menyanthidis trifoliatae folium, Cichorii herba, Cichorii radix, Pyrethri flos.	3
4. Cardiac glycosides: Digitalis purpureae folium, Digitalis lanatae folium, Strophanthi semen, Convallariae herba, Adonidis herba, Hellebori rhizoma, Scillae bulbus, Nerii folium.	3
5. Triterpenoid saponins: Ginseng radix, Liquiritiae radix, Primulae rhizoma cum radicibus, Saponariae albae radix, Saponariae rubrae radix, Ononidis radix, Equiseti herba, Betulae folium, Herniariae herba, Hederae folium, Hippocastani semen.	3
6. Carotenoids: Calendulae flos, Croci stigma, Tagetes flos, Urticae folium, Urticae radix.	3
7. Essential oils. Background. Acyclic monoterpenes: Lavandulae flos et aetheroleum, Bergamotae aetheroleum, Coriandri fructus et aetheroleum, Melissa folium et aetheroleum, Citronellae aetheroleum, Aurantii pericarpium et aetheroleum, Naphae flos, Naphae (Neroli) aetheroleum, Citri pericarpium et aetheroleum.	3
8. Monocyclic monoterpenes: Menthae folium, herba et aetheroleum, Carvi fructus et aetheroleum, Eucalypti folium et aetheroleum, Niaouli aetheroleum, Cajeputi aetheroleum, Rosmarini folium et aetheroleum, Chenopodii aetheroleum, Thymi herba et aetheroleum, Serpylli herba, Origani herba, Arnicae flos, Angelicae radix, Angelicae fructus.	3
9. Bicyclic monoterpenes: Salviae officinalis folium, Terebinthinae aetheroleum, Pini montanae aetheroleum, Juniperi fructus et aetheroleum, Pini turio, Hyssopi herba, Camphora.	3
10. Sesquiterpenes: Chamomillae flos et aetheroleum, Chamomillae romanae flos, Millefolii flos et aetheroleum, Absinthii herba, Inulae radix, Echinaceae radix, Echinaceae herba, Zingiberis rhizoma et aetheroleum.	3
11. Aromatic derivatives: Cinnamomi cortex et aetheroleum, Caryophylli flos et aetheroleum, Anisi vulgaris fructus et aetheroleum, Anisi stellati fructus, Foeniculi fructus et aetheroleum, Calami rhizoma.	3
12. Resins and balsams. True resins: Colophonium. Oleoresins: Terebinthina communis. Balsams: Balsamum Peruvianum, Balsamum Tolutanum, Benzoe, Balsamum Canadense. Tars: Pix liquida,	3

8.2. LABORATORY ACTIVITIES / PRACTICAL WORKS (subjects / themes)	
<i>Pix cadi, Pix lithanthracis, Ichthammolum. Vitamins: Rosae pseudo-fructus, Hippophaë fructus, Faex medicinalis. Varia: Maydis stigma, Symphyti radix, Phaseoli pericarpium, Galegae herba, Bursae-pastoris herba, Xanthii spinosi herba, Lycopodium, Mori folium, Carbo medicinalis.</i>	
13. Global chemical analysis of the studied active principles: extraction, separation, identification.	3
14. Practical test of macroscopic, microscopic and phytochemical analysis.	3

REFERENCES

1. Ciulei I., Grigorescu Em., Stănescu Ursula. (1993) *Plante medicinale. Fitochimie și Fitoterapie*, vol. I, II, Ed. Medicală, București.
2. Gîrd Cerasela Elena, Duțu Ligia Elena, Popescu Maria Lidia, Pavel Mariana, Iordache Alina Titina, Tudor Ioana. (2008, 2009) *Bazele teoretice și practice ale analizei farmacognostice*, vol. I, II, Ed. „Curtea Veche”, București.
3. Oniga Ilioara, Benedec Daniela, Hanganu Daniela. (2003) *Analiza produselor naturale medicinale*, Ed. Medicală Universitară „Iuliu Hațieganu”, Cluj-Napoca.
4. Wagner H., Bladt Sabine. (1996) *Plant Drug Analysis. A Thin Layer Chromatography Atlas*, Springer Verlag, Berlin–Heidelberg.

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 gained in the pharmacognosy–phytotherapy discipline provides support for the understanding of the raw materials of medicinal interest, from the point of view of origin, distribution, methods of production, chemical composition, pharmacological action, transformation in pharmaceutical forms, therapeutic indications (phytotherapy).
- Practical skills and accumulated capabilities are the basis for the analysis and control of natural medicinal products in the laboratories for the control of natural medicines (general pharmacognosy analysis).

10. METHODOLOGICAL BENCHMARKS

Forms of activity	Teaching/learning techniques, materials, resources: presentation, interactive course, group work, learning through problems / projects, etc. In case of special situations (alert states, emergency states, other types of situations that limit the physical presence of people), the activity can be carried out online, using computer platforms approved by the Faculty/University. The online education process will be adapted accordingly to ensure the fulfillment of all the objectives provided in the discipline sheet.
Lecture	The following combined methods are used: lecture, debate, problematization. For the online version: lecture, debate, problematization based on materials provided in advance.
Laboratory activities / Practical works	The following combined methods are used: practical applications, case study, projects. For the online version: experimental descriptions, projects, debate based on materials provided in advance. The presentations will be accompanied by explanatory video material on how to develop and implement the practical application.
Individual study	Before each lecture and each practical work.

11. RECOVERY PROGRAM

Recovering of the absences	No. of absences that can be recovered / semester	Place of performance	Period	Person in charge	Programming the topics
	3	Laboratory of Pharmacognosy / online environment	The last two weeks	Holder of practical works	According to the discipline schedule
Program of consultations / Student's debating circle	2 hours/week	Laboratory of Pharmacognosy / online environment	The last two weeks	Holder of practical works	According to the discipline schedule
Program for poorly trained students	4 hours/semester	Laboratory of Pharmacognosy / online environment	The last two weeks	Holder of practical works	According to the discipline schedule

12. ASSESSMENT

Form of activity	Forms of assessment	Methods of assessment	Percentage of the final grade
<i>Lecture</i>	Oral	Exam (oral) / single- and multiple-choice system using the computer platform in the online version	60%
<i>Laboratory activities / Practical works</i>	Oral	In the last week of the semester (oral) / with the help of the video platform in the online version	20%

Periodical verifications	10%
Lecture attendance	10%
Minimum performance standard	
▪ Knowledge of natural medicinal products: origin, distribution, method of production, chemical composition (active principles), methods of extraction and analysis of active principles, pharmacological action, therapeutic indications, pharmaceutical forms; ▪ Basic knowledge about phytotherapy: the use of plants and plant extracts as medicines.	

13. PROFESSIONAL COUNSELING AND GUIDANCE PROGRAMS

Professional counseling and guidance programs (2 hours/month)		
<i>Time programming</i>	<i>Place of performance</i>	<i>Person in charge</i>
Last Friday of every month, between 12 ⁰⁰ –14 ⁰⁰	Laboratory of Pharmacognosy	George Dan Mogoşanu Associate Professor, PhD

Note:

- 1) Study cycle – choose one of the variants: B (bachelor's degree, license) / M (master) / PhD (*philosophiae doctor*, doctorate).
- 2) Type (content) – choose one of the variants:
 - for the Bachelor's level: FD (fundamental discipline) / DF (discipline from the field) / SD (specialty discipline) / CD (complementary discipline);
 - for the Master's level: DD (discipline of deepening) / DS (discipline of synthesis) / DAK (discipline of advanced knowledge).
- 3) Discipline status (compulsoriness) – choose one of the following options: ComD (compulsory discipline) / OD (optional discipline) / FacD (facultative discipline).
- 4) One credit is equivalent to 25–30 hours of study (didactic activities and individual study).
- 5) A bonus for attendance may be granted.
- 6) Of the five professional competences (those that go into the transcript of records) the ones in which the discipline fall are chosen.
- 7) Transversal competences are three and are written from C6–C8: C6. Autonomy and responsibility; 7. Social interaction; 8. Personal and professional development.