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FACULTY OF PHARMACY

STUDY PROGRAM 0916.1 PHARMACY

CHAIR OF PHARMACOGNOSY AND PHARMACEUTICAL BOTANY

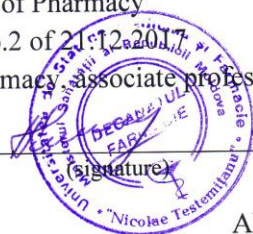
APPROVED

at the meeting of the Commission for Quality Assurance and Evaluation of the Curriculum faculty of Pharmacy

Minutes No.2 of 21.12.2017

Chairman, PhD pharmacy associate professor

UNCU Livia



APPROVED

at the Council meeting of the Faculty of Pharmacy

Minutes No.2 of 22.12.2017

Dean of Faculty, PhD pharmacy associate professor

CIOBANU Nicolae



APPROVED

approved at the meeting of the chair of Pharmacognosy and pharmaceutical botany

Minutes No.10 of 10.11.2017

Head of chair, Dr. hab. biology, university professor

CALALB Tatiana


(signature)

SYLLABUS

DISCIPLINE TOXIC PLANTS

Integrated studies

Type of course: **Compulsory discipline**

Chisinau, 2017



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INTRODUCTION

- General presentation of the discipline: place and role of the discipline in the formation of the specific competences of the professional / specialty training program

During the studies at the pharmacy the students acquire knowledge of cytology, histology, organography and systematic of plants at Pharmaceutical botany, then at the Pharmacognosy, they have the occasion to find out that a part of the plant (aerial parts, leaves, flowers, rhizomes, roots, tubers, fruits) is toxic and lethal, beyond the quantities recommended for the therapeutic effects. Retaken at Toxic Plants, this knowledge is improved and completed with the chemical compounds and the causes of intoxication; the characteristic symptomatology, the antidotes and methods applied for the chemical toxicological analysis. In addition, with increased interest in phytotherapy, and the use of medicinal plants, the risk of intoxication also increases. These may occur in the case of self-medication, incorrect administration, overdose, and the preconceived idea of plant harmlessness. In conclusion, the pharmacist, the specialist in the field of drugs (medicines), the doctor's adviser concerning the prescription of remedies, should contribute to the prevention, identification and treatment of intoxication.

- Mission of the curriculum (aim) in professional training

To provide pharmacists with the whole set of concepts necessary for initiation in this new field of study and is equally a tool for information and work in pharmacies, medical offices and in units specialized in the prevention and first aid in plant poisoning.

- Languages of the course: Romanian, English
- Beneficiaries: students of the Vth year, faculty of Pharmacy

I. MANAGEMENT OF THE DISCIPLINE

Code of discipline	S. 09.O.091		
Name of the discipline	Toxic plants		
Person in charge of the discipline	Tatiana Chiru PhD, associate professor		
Year	V	Semester	IX
Total number of hours, including:			60
Lectures	14	Practical/laboratory hours	42
Seminars	-	Self-training	4
Form of	DC	Number of credits	2



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assessment

II. TRAINING AIMS WITHIN THE DISCIPLINE

At the end of the discipline study the student will be able to:

- **at the level of knowledge and understanding:**
 - toxic, toxicity, toxic substances (alkaloids, glycosides, volatile oils, etc.);
 - the mechanism of protection of toxic plant;
 - the chemotaxonomic and toxic selectivity of the plants depending on the growing conditions;
 - factors that influence the severity of intoxication;
 - the features of the toxic effect of plant toxins;
 - analysing statistical data to understand that plant poisoning is quite common and essentially affects children.
- **at the application level:**
 - to identify toxic plants, vegetable products using macroscopic characters;
 - to apply the rules on protection of work and the environment;
 - to apply bans on children's access to cultivated land with toxic plants;
 - based on the identification and dosing reactions of toxic substances to determine the causes of intoxication.
- **at the integration level:**
 - to assess the results of the methods for intoxications diagnosing;
 - to make optimal decisions on first aid in plant and phytotoxic poisoning;
 - to make instructions to reduce accidents in workplaces where the risks of intoxication are high: cultivation, harvesting, processing, transport, storage of toxic plants.

III. PROVISIONAL TERMS AND CONDITIONS

Discipline Toxic Plants creates the conditions of the acquisition of knowledge about toxic plants from the point of view of origin, pharmacological characterization, toxicological implications (intoxication symptoms, antidotes) and correlates with Pharmaceutical Botany, Chemistry, Pharmacognosy, Pharmacology, Toxicology.

IV. THEMES AND ESTIMATE ALLOCATION OF HOURS

Lectures, practical hours/ laboratory hours/seminars and self-training

No. d/o	THEME	Number of hours		
		Lectures	Practical hours	Self-training
1.	Chemical classification of plant compounds.	-	6	1
2.	General knowledge about toxic plants. Classification of toxic plants. Mechanisms of plant toxic protection. Toxic plant organs. Features of toxic effect of the plants. First aid and prevention in case of plant	2	3	2



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No. d/o	THEME	Number of hours		
		Lectures	Practical hours	Self-training
	intoxication.			
3.	Toxic plants containing alkaloids. <i>Equisetum</i> sp., <i>Taxus baccata</i> , <i>Colchicum autumnale</i> , <i>Conium maculatum</i> , <i>Aconitum</i> sp., <i>Gleditsia triacanthos</i> .	4	3	
4.	<i>Viscum album</i> , <i>Cicuta virosa</i> , <i>Cynanchum vincetoxicum</i> , <i>Ricinus communis</i> , <i>Cynoglossum officinale</i> .		3	
5.	<i>Atropa belladonna</i> , <i>Hyoscyamus niger</i> , <i>Datura</i> sp., <i>Scopolia carniolica</i> , <i>Solanum dulcamara</i> .		3	
6.	<i>Cannabis</i> sp., <i>Papaver somniferum</i> , <i>Echinops ritro</i> , <i>Corydalis cava</i> , <i>Veratrum nigrum</i> , <i>Chelidonium majus</i> .		3	
7.	<i>Aristolochia clematitis</i> , <i>Bryonia alba</i> , <i>Cytisus laburnum</i> , <i>Nicotiana tabacum</i> , <i>Claviceps purpurea</i> .		3	
8.	Toxic plants containing glycosides (cardiotonic and cyanogenic glycosides). <i>Digitalis</i> sp., <i>Convallaria majalis</i> , <i>Erysimum</i> sp., <i>Amygdalus communis</i> , <i>Sambucus ebulus</i> .	2	3	
9.	Toxic plants containing glycosides. <i>Saponaria officinalis</i> , <i>Arum maculatum</i> , <i>Paris quadrifolia</i> , <i>Polygonatum odoratum</i> , <i>Ligustrum vulgare</i> , <i>Ranunculus</i> sp.		3	
10.	Toxic plants containing volatile oils. <i>Juniperus sabina</i> , <i>Artemisia absinthium</i> , <i>Tanacetum vulgare</i> , <i>Oenanthe</i> sp., <i>Dictamnus albus</i> , <i>Ledum palustre</i> , <i>Daphne mezereum</i> , <i>Pteridium aquilinum</i> , <i>Ambrosia</i> sp.	2	3	
11.	Toxic plants containing phenolic compounds. <i>Heracleum sosnowskyi</i> , <i>Humulus lupulus</i> , <i>Melilotus offinalis</i> , <i>Dryopteris filix-mas</i> , <i>Pulsatilla pratensis</i> , <i>Euphorbia</i> sp., <i>Hypericum perforatum</i> .	2	3	
12.	Toxic ornamental plants. <i>Spathiphyllum</i> sp., <i>Dieffenbachia</i> sp., <i>Buxus sempervirens</i> , <i>Monstera deliciosa</i> , <i>Cyclamen</i> sp., <i>Codiaeum variegatum</i> , <i>Ficus</i> sp., <i>Anthurium</i> sp., <i>Aglaonema</i> sp., <i>Hedera helix</i> , <i>Epipremnum aureum</i> , <i>Lilium</i> sp., <i>Nerium oleander</i> .	2	6	1
Total		14	42	4

V. REFERENCE OBJECTIVES OF CONTENT UNITS

Objectives	Content units
Theme 1. General knowledge about toxic plants.	
<ul style="list-style-type: none"> to know the classification of toxic plants to classify phytochemical toxic substances to understand mechanisms of plant toxic protection to define toxic organs of the plants 	<ol style="list-style-type: none"> Toxic, very toxic and deadly plants. Alkaloids, saponosides, cardiotonic and cyanogenic glycosides, cumarins, volotile oils, phenolic compounds. Mechanisms of plant toxic protection. Toxic organs of the plants. Neurotoxic, cardiotoxic and cytotoxic actions.



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Objectives

- to explain features of toxic effect of the plants
- to apply the measurements of the first aid and prevention in case of plant intoxication

Content units

6. Prevention and treatment in case of plant intoxication.

Theme 2. Toxic plants containing alkaloids.

- to know the latin and english names of the toxic plants containing alkaloids
- to identify the toxic part of the plants containing alkaloids
- to name chemical substances responsible for the toxic effect of the plants containing alkaloids
- to know the causes of plant containing alkaloids poisoning
- to understand and explain mechanisms of alkaloid-containing plants toxic protection
- to characterize the symptoms of intoxication and the clinical pictures of poisoning with alkaloid-containing plants
- to explain the measurements of the first aid and symptomatic treatment in case of alkaloid-containing plants intoxication
- to apply the acquired knowledge for the analysis of poisoning cases with alkaloid-containing plants

1. Toxic plants containing alkaloids: *Equisetum* sp., *Taxus baccata*, *Colchicum autumnale*, *Conium maculatum*, *Aconitum* sp., *Gleditsia triacanthos*, *Atropa belladonna*, *Hyoscyamus niger*, *Datura* sp., *Scopolia carniolica*, *Ricinus communis*, *Solanum dulcamara*, *Cannabis* sp., *Papaver somniferum*, *Echinops ritro*, *Corydalis cava*, *Veratrum nigrum*, *Chelidonium majus*, *Aristolochia clematidis*, *Bryonia alba*, *Cytisus laburnum*, *Cynoglossum officinale*, *Nicotiana tabacum*, *Claviceps purpurea*, *Viscum album*, *Cicuta virosa*, *Cynanchum vincetoxicum*.
2. The recognition criteria of alkaloid-containing plants.
3. Distribution of plants containing alkaloids.
4. The toxic organ/part of plants containing alkaloids.
5. Chemical substances responsible for the toxicity of plants containing alkaloids.
6. The mechanism of toxicity of plants containing alkaloids.
7. The causes of plant containing alkaloids poisoning.
8. Symptoms of poisoning of plants containing alkaloids.
9. The first aid in case of alkaloid-containing plants intoxication .
10. The use in the traditional and scientific medicine of poisonous plants containing alkaloids.

Theme 3. Toxic plants containing glycosides

- to know the latin and english names of the toxic plants containing glycosides
- to identify the toxic part of the plants containing glycosides

1. Toxic plants containing glycosides: *Digitalis* sp., *Convallaria majalis*, *Erysimum diffusum*, *Amygdalus communis*, *Sambucus ebulus*, *Saponaria officinalis*, *Arum maculatum*, *Paris quadrifolia*, *Polygonatum odoratum*, *Ligustrum vulgare*, *Ranunculus* sp.



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Objectives

- to name chemical substances responsible for the toxic effect of the plants containing glycosides
- to know the causes of plant containing glycosides poisoning
- to understand and explain mechanisms of glycosides containing plants toxic protection
- to characterize the symptoms of intoxication and the clinical pictures of poisoning with glycosides containing plants
- to explain the measurements of the first aid and symptomatic treatment in case of glycosides containing plants intoxication
- to apply the acquired knowledge for the analysis of poisoning cases with glycosides containing plants

Content units

2. The recognition criteria of plants containing glycosides.
3. Distribution of plants containing glycosides.
4. The toxic organ/part of plants containing glycosides.
5. Chemical substances responsible for the toxicity of plants containing glycosides.
6. The mechanism of toxicity of plants containing glycosides.
7. The causes of plant containing glycosides poisoning.
8. Symptoms of poisoning of plants containing glycosides.
9. The first aid in case of plants containing glycosides intoxication.
10. The use in the traditional and scientific medicine of poisonous plants containing glycosides.

Theme 4. Toxic plants containing volatile oils

- to know the latin and english names of the toxic plants containing volatile oils
- to identify the toxic part of the plants containing volatile oils
- to name chemical substances responsible for the toxic effect of the plants containing volatile oils
- to know the causes of plant containing volatile oils poisoning
- to understand and explain mechanisms of volatile oils containing plants toxic protection
- to characterize the symptoms of intoxication and the clinical pictures of poisoning with volatile oils containing plants
- to explain the measurements of the first aid and symptomatic treatment in case of volatile oils containing plants intoxication
- to apply the acquired knowledge for the analysis of poisoning cases with volatile oils containing plants

1. Toxic plants containing volatile oils: *Cynanchum vincetoxicum*, *Juniperus sabina*, *Tanacetum vulgare*, *Oenanthe sp.*, *Dictamnus albus*, *Ledum palustre*, *Daphne mezereum*, *Pteridium aquilinum*, *Ambrosia sp.*
2. The recognition criteria of plants containing volatile oils.
3. Distribution of plants containing volatile oils.
4. The toxic organ/part of plants containing volatile oils.
5. Chemical substances responsible for the toxicity of plants containing volatile oils.
6. The mechanism of toxicity of plants containing volatile oils.
7. The causes of plant containing volatile oils poisoning.
8. Symptoms of poisoning of plants containing volatile oils.
9. The first aid in case of plants containing volatile oils intoxication.
10. The use in the traditional and scientific medicine of poisonous plants containing volatile oils.

Theme 5. Toxic plants containing phenolic compounds



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Objectives

- to know the latin and english names of the toxic plants containing phenolic compounds
- to identify the toxic part of the plants containing phenolic compounds
- to name chemical substances responsible for the toxic effect of the plants containing phenolic compounds
- to know the causes of plant containing phenolic compounds poisoning
- to understand and explain mechanisms of plants containing phenolic compounds toxic protection
- to characterize the symptoms of intoxication and the clinical pictures of poisoning with plants containing phenolic compounds
- to explain the measurements of the first aid and symptomatic treatment in case of plants containing phenolic compounds intoxication
- to apply the acquired knowledge for the analysis of poisoning cases with plants containing phenolic compounds

Content units

1. Toxic plants containing phenolic compounds: *Heracleum sosnowskyi*, *Humulus lupulus*, *Melilotus officinalis*, *Dryopteris filix-mas*, *Pulsatilla pratensis*, *Euphorbia sp.*, *Hypericum perforatum*.
2. The recognition criteria of plants containing phenolic compounds.
3. Distribution of plants containing phenolic compounds.
4. The toxic organ/part of plants containing phenolic compounds.
5. Chemical substances responsible for the toxicity of plants containing phenolic compounds.
6. The mechanism of toxicity of plants containing phenolic compounds.
7. The causes of plant containing phenolic compounds poisoning.
8. Symptoms of poisoning of plants containing phenolic compounds.
9. The first aid in case of plants containing phenolic compounds intoxication.
10. The use in the traditional and scientific medicine of poisonous plants containing phenolic compounds.

Theme 6. Toxic ornamental plants

- to know the latin and english names of the toxic ornamental plants
- to identify the toxic part of the toxic ornamental plants
- to name chemical substances responsible for the toxic effect of the toxic ornamental plants
- to know the causes toxic ornamental plants poisoning
- to understand and explain mechanisms of ornamental plants toxic protection
- to characterize the symptoms of intoxication and the clinical pictures of poisoning with toxic ornamental plants
- to explain the measurements of the first aid and symptomatic treatment in case of toxic ornamental plants
- to apply the acquired knowledge for the analysis of poisoning cases with toxic ornamental plants

1. Toxic ornamental plants: *Spathiphyllum sp.*, *Dieffenbachia sp.*, *Buxus sempervirens*, *Monstera deliciosa*, *Cyclamen sp.*, *Codiaeum variegatum*, *Ficus sp.*, *Anthurium sp.*, *Aglaonema sp.*, *Hedera helix*, *Epipremnum aureum*, *Lilium sp*, *Nerium oleander*.
2. The recognition criteria of the toxic ornamental plants.
3. Distribution of the toxic ornamental plants.
4. The toxic organ/part of the ornamental plants.
5. Chemical substances responsible for the toxicity of the toxic ornamental plants.
6. The mechanism of toxicity of the toxic ornamental plants.
7. The causes of the toxic ornamental plants poisoning.
8. Symptoms of poisoning of the toxic ornamental plants.
9. The first aid in case of the ornamental plants intoxication.
10. The use in the traditional and scientific medicine of the toxic ornamental plants.



VI. PROFESSIONAL (SPECIFIC (SC)) AND TRANSVERSAL (TC) COMPETENCES AND STUDY OUTCOMES

✓ Professional (specific) (SC) competences

- PC1. Knowledge of the theoretical basis for the subject Toxic Plants and the notions of toxic, toxicity, poisonous parts, intoxication, and antidote.
- PC2. Knowledge of vegetal products and phytoproducts containing eventually toxic active principles through the prism of actions, indications, counter-indications, adverse effects, and administration way and their interactions; practical implementation of preventive patient counseling actions and pharmaceutical assistance in the case of plant intoxication.
- PC3. Utilization and adaptation of the theoretical knowledge gained in the subject Toxic Plants in practical activity situations; streamlining of the professional activity through introduction of innovating elements in the area of pharmaceuticals; implementation, in the practical activity, of the normative act requirements in the area of pharmaceuticals; proficiency in PC as a working tool in the theoretical and practical pharmaceutical activity; establishment of the correlation between the components of the pharmaceutical activity process and the system of medical assistance of population; continuous streamlining of the pharmaceutical activity through introduction of innovations and implementation of inventions in said area.
- PC4. Diagnostics of the particular features and logistic culture of the pharmaceutical institution where the specialist activates; and coordination of the pharmaceutical activity in different institutions; open public or private pharmacies; hospital pharmacies; pharmaceutical stores; drug factories, laboratories for assessment of the quality and certification of medicines, forensic expertise laboratories etc.; active specialist involvement in the process of accomplishment of the pharmaceutical institution mission; demonstration of the capacity to make decisions oriented towards streamlining of the pharmaceutical system.
- PC5. Identification of the criteria of the efficiency assessment in the pharmaceutical system and personal activity depending on the actual conditions and in a specific social context; identification of the management methods applied in the pharmaceutical activity on the basis of the assessment findings; identification of the research issues in the area of pharmaceuticals; knowledge of the methodology of science studies in the practice activities of a pharmacist or manager in a pharmaceutical unit.
- PC6. Adjustment of the messages to diverse social/cultural media including through communication in more foreign languages; employment of the problem solving capacity in the case of intoxication with medicinal plants, vegetal products and phytoproducts containing eventually toxic active principles through collaboration with physicians; promotion of the principles of tolerance and compassion towards patients; utilization of informational technologies (and PC) in the pharmaceutical activity.

✓ Transversal competences (TC)

- TC1. Promotion of the spirit of initiative, dialogue, cooperation, positive attitude and respect towards others, empathy, altruism and continuous improving of own activities.
- TC2. Responsible implementation of individual tasks and team activities.
- TC3. Efficient utilization of linguistic skills, knowledge in informational technologies, and competence in research and communication.

✓ Study outcomes

By the end of the course Toxic Plants, a student will be capable:

- To know the criteria of toxic plant classification.
- To identify toxic plants.



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- To make optimal decisions in offering primary assistance in the case of intoxication with toxic plants. To be able to identify specific symptoms in the case of intoxication with toxic plants.
- To be capable to deduct possible reasons of intoxication with toxic plants.
- To be competent to critically and confidently use the scientific information acquired and apply new information and communication technologies.
- To apply the knowledge gained in the professional activity and everyday life.

Note. Study outcomes (are deduced from the professional competencies and formative valences of the informational content of the discipline).

VII. STUDENT'S SELF-TRAINING

No.	Expected product	Implementation strategies	Assessment criteria	Implementation terms
1.	Thematic Reports	Search, analyses, generalization, and coherent presentation of the information acquired	The quality of systematization and analyses of the informational material acquired through individual activity	During the semester
2.	Case studies	Establishing students' contact with complex, authentic reality in the respective topic with the aim of their familiarization with possible aspects and in order to develop decisional, operative, and optimal skills and capacity to solve eventual similar cases. Description and critical analyses of the case studies.	Capacity of systematization and consolidation of the knowledge acquired in the class. Assessment of the knowledge application in real situations created.	During the semester
3.	Development of the portfolio (intoxication with poisonous plants, statistical data, treatment schemes in the case of intoxication with poisonous plants etc.)	The development implies three formats: paper (folders with informative material), hybrid (folders with informative material, pictures, video, audio material etc), and electronic/digital format (audio, video and	It is a tool of self-evaluation, critical vision formation in the students about their own research; the evaluation portfolio/dossier is used to appreciate the level of competence development aiming at the finality. The materials differ in the content but allow	During the semester



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graphic images)

appreciation of the process and the result of the studies. The appreciation will imply content evaluation, implementation correctness, accuracy, value of the information presented, and truthfulness of the reference sources.

VIII. METHODOLOGICAL SUGGESTIONS FOR TEACHING-LEARNING-ASSESSMENT

- ***Teaching and learning methods used***

Within the subject Toxic Plants, the lectures contain the whole theoretical material delivered in the auditorium using different materials and didactic methods, i.e. T graph, Vienn diagram, mosaics, brainstorming etc. The practical works are various and include oral or written answers to the questions referring to herbaria, vegetable products, tests. Simultaneously, the interactive method of analysed information presentation is used in conferences where subject reports will be delivered and further discussed. For this, the student having the parameters characterizing each plant as a plan and using different scientific reference and folk sources will prepare a report to be delivered before the class presenting vegetable products, drawings and images of the toxic plants and chemical substances responsible for the toxic effect, action mechanism etc.

- ***Applied teaching strategies / technologies (specific to the discipline)***

To accomplish the method of teaching and acquiring knowledge of the subject with the aim of scientific report delivering unification, the students are proposed individually to characterize each toxic plant according to the following compartments:

1. The latin and english name of the produced plant.
2. The latin name of the family.
3. Botanical description of the toxic plant.
4. Geographical spreading of the plant (continents, countries, places of growth). To mention the places of growth in the Republic of Moldova.
5. The poisonous organs (parts) of the plant.
6. The chemical composition (structural formulas) of the plant (only the chemical compounds that determine the toxicity of the plant).
7. Mechanism of toxic action of chemical compounds.
8. Causes of intoxication (in which cases poisoning is possible).
9. Symptoms of intoxication.
10. First medical aid in case of poisoning with this plant.
11. Etymology of the name of the plant in different languages.
12. Uses in scientific medicine:
 - a) pharmacological action of the plant;



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- b) therapeutic indications;
 - c) medications and phytopreparations.
13. Use in homeopathy.
 14. Use in traditional medicine.
 15. History of plant.
 16. Legends, myths etc.

- **Methods of assessment (including the method of final mark calculation)**

Current. For the subject Toxic Plants, two totalizations are planned during the semester that include general questions and 24-30 toxic plants. The evaluation of the students' knowledge within the totalization works is based on combination of different procedures that include written works on different subjects (coefficient 0.5) and appreciation of practical skills (coefficient 0.5). The tests are graded separately from 1 to 10, in the case of a negative grade (2-5), each test can be tried twice plus once in the last week of the semester (attestation week). The annual average grade is formed based on the totalization works grades (2) and the grade for the individual work.

Final: Differentiated colloquium. The final grade consists of the average annual grade (coefficient 0.5) and the grade of the seminar (oral and practical skills), coefficient 0.5. The students with an average annual grade under 5, as well as those who haven't recovered the practical works missed will not be admitted to the final seminar (graded).

Method of mark rounding at different assessment stages

Intermediate marks scale (annual average, marks from the examination stages)	National Assessment System	ECTS Equivalent
1,00-3,00	2	F
3,01-4,99	4	FX
5,00	5	E
5,01-5,50	5,5	
5,51-6,0	6	
6,01-6,50	6,5	D
6,51-7,00	7	
7,01-7,50	7,5	C
7,51-8,00	8	
8,01-8,50	8,5	B
8,51-8,00	9	
9,01-9,50	9,5	A
9,51-10,0	10	



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The average annual mark and the marks of all stages of final examination (computer assisted, test, oral) - are expressed in numbers according to the mark scale (according to the table), and the final mark obtained is expressed in number with two decimals, which is transferred to student's record-book.

Absence on examination without good reason is recorded as "absent" and is equivalent to 0 (zero). The student has the right to have two re-examinations.

IX. RECOMMENDED LITERATURE:

A. Compulsory:

1. Suport de curs/Course support information on Department web-site.
2. John M. Kingsbury. Common poisonous plants. A Cornell Cooperative, 1994.
3. Журба О.В., Дмитриев М.Я. Лекарственные, ядовитые и вредные растения. М.: Колос, 2008.
4. Карасева Е.И., Бутвиловский В.Э. Ядовитые грибы и растения. Минск, 2012.

B. Additional

1. Hodgson E. A textbook of modern toxicology, 3rd edition, Wiley Interscience, 2004.
2. Nisteanu A., Calalb T. Analiza farmacologică a produselor vegetale medicinale. CEP Medicina, Chișinău, 2016.
3. Зориков П. С., Ядовитые растения леса. Владивосток, Дальнаука, 2005.
4. <http://plantlife.ru/books/item/f00/s00/z0000023/index.shtml>
5. <http://counties.agrilife.org/valverde/files/2014/11/Integrated-Toxic-Plant-Management-Handbook.pdf>