

Study program: Integrated academic studies of Pharmacy			
Type and level of the study program: integrated academic studies			
Course title: GENERAL BOTANY (PHI-GBOT)			
Teacher: Jadranka Z. Luković, Lana N. Zorić			
Course status: compulsory			
ECTS Credits: 5			
Condition: -			
Course aim The main aim of the course General Botany is introducing students to the main principles of structure of vegetative and reproductive organs of higher plants, their reproduction, as well as use of plant organs for pharmaceutical purposes. Development of skills in practical application of the obtained knowledge.			
Expected outcome of the course: Introducing students to morphology of vegetative and reproductive organs, as well as their anatomical structure. Understanding of structural and functional coordination of plant organs and plant organism as a whole. Pharmaceutical use of vegetative and reproductive organs. Obtained knowledge is the basis for studying Plant Systematics and Pharmacognosy. Obtaining skills in preparing microscopic slides, analysis and evaluation of anatomical characteristics which can be used in pharmacological investigations: determination of plant drugs, identification of authentic plant drugs and their substituents.			
Course description			
<i>Theoretical education</i>			
<ol style="list-style-type: none"> 1. Botany: introduction, characteristics and the role of plants in nature, classification of botany, relationship between botany and pharmacy. Cytology: introduction, definition of cell and cell types, the structure of plant cell, plasma membranes. 2. Cytology: plastids - types, structure and roles. Plastid pigments. Ergastic substances in cytoplasm: starch and aleurone grains, oils, essential oils. 3. Cytology: ergastic substances in cytoplasm - vacuole, cell sap (carbohydrates, pigments, glycosides, tannins, alkaloids), calcium-oxalate crystals. The cell wall and pits. Secondary changes of the cell wall. 4. Histology - introduction, definition and classification of tissues. Meristematic tissues. Permanent tissues - parenchyma tissues. 5. Histology - permanent tissues. Dermal and mechanical tissues. 6. Histology - permanent tissues: Vascular tissues, types of vascular bundles. Secretory tissues. 7. Organography: Morphological organization of plants. Embryo. Vegetative organs 8. Organography: Root - morphology and anatomy. Morphology and anatomy of metamorphosed roots. 9. Organography: Shoot - morphology and anatomy. 10. Organography: Leaf - morphology and anatomy. 11. Organography: Morphology and anatomy of metamorphosed vegetative organs. 12. Plant reproduction: asexual, sexual, alternation of generations, plant life cycles. 13. Reproduction of Angiosperms: flower, inflorescences, classification of inflorescences. 14. Pollination and double fertilization, formation of seed and fruit. 15. Reproductive organs of Angiosperms: fruit - morphology and anatomy, classification of fruits. 			
<i>Practical education: exercises, other forms of education, research related activities</i>			
<ol style="list-style-type: none"> 1. Microscope: parts, handling. The structure of plant cell. Turgor and plasmolysis. 2. Cytoplasmic streaming. Chloroplasts, carotenoidoplasts and leucoplasts. Starch and aleurone grains. 3. Crystals. Cell wall, pits. Local cell wall thickenings. 4. Apical meristems - shoot and root tip. Parenchyma tissues: photosynthetic, storage and absorption parenchyma. 5. Mechanical tissues: collenchyma, fibers, sclereids. Dermal tissues: epidermis and stomata. Trichomes. Periderm, lenticels, dead bark. 6. Vascular tissues: Concentric, collateral, bicollateral and radial vascular bundles. External and internal secretory structures. 7. Monocot and dicot embryo. Root morphology: root system types, root zones. Primary and secondary root structure. Root metamorphoses. 8. Shoot - morphology. Types of shoot branching. Primary anatomical structure of dicot and monocot stem. 9. Secondary anatomical structure of conifer and dicot stem. 10. Leaf morphology. 11. Leaf anatomy: monocots, dicots and conifers. Anatomical structure of xeromorphic leaves. Petiole anatomical structure. 12. Shoot and leaf metamorphoses. Rhizome anatomical structure. 13. Flower: morphology, flower formula and diagram. Anatomy of ovary and anther. Pollen grains. Inflorescences: morphology and classification. 14. Morphology of seeds and fruits. Anatomy of seed coat and pericarp. 15. Classification of fruits - morphological collection. 			
Literature			
<i>Compulsory</i>			
<ol style="list-style-type: none"> 1. Rudall P. Anatomy of Flowering Plants. Cambridge University Press, Cambridge, 2007. 2. Lukovic, J, Zoric, L. Morfologija biljaka, praktikum. Simbol, Novi Sad, 2013. (with translation) 			
<i>Additional</i>			
<ol style="list-style-type: none"> 1. Dickison CV. Integrative Plant Anatomy, Academic Press, New York, London, 2000. 			
Number of active classes			Other:
Lectures: 30	Practice: 45	Other types of teaching:	
Teaching methods lectures, exercises, consultations			
Student activity assessment (maximally 100 points)			
Pre-exam activities	points	Final exam	points
Lectures		Written	20
Practices		Oral	50
Colloquium	30	
Essay			