Study program: Integrated Academic Studies of Pharmacy

Type and level of studies: Master of Pharmacy

Course unit: Basics of Pharmacognosy and Phytotherapy

Teacher in charge: Assistant professor Miroslav Sovrlic

Language of instruction: English

ECTS: 5

Prerequisites: General background in organic chemistry, analytical chemistry, physical, chemistry, biochemistry and botany

Semester: Summer Semester, Third year

Course unit objective:

Providing knowledge of pharmacologically active metabolites of plants and animals (chemical and physical characteristics, distribution and biological activity, qualitative and quantitative analysis, isolation and chemical characterization of bioactive compounds) and natural medicinal raw materials - drugs (morphological and anatomical characteristics, chemical ingredients, method of production, identification, quality testing, action, application).

Providing knowledge of the place and role of phytotherapy in the primary care system and self-medication, herbal remedies (as active components contain herbal drugs or preparations herbal drugs), justification for their use for the recovery, preservation and promotion of health.

Learning outcomes of Course unit:

The student should be able to perform a qualitative and quantitative analysis of the natural medicinal ingredients, conceptualize and perform the procedure of their extraction and separation into laboratory conditions, knows the natural raw materials for isolating medicinal ingredients for needs of the pharmaceutical industry, be able to identify, examine general and specific quality of drugs, knows the possibilities of their use, participates in conception, organizing and managing of the drug production process and ensuring its quality.

The student should be familiar with the principles of rational phytotherapy, the active components of herbal remedies and mechanisms of action of active ingredients, perform procedures for quality assurance and control of active components and herbal remedies, suggests active component(s) of herbal remedy, build critical attitude to a particular herbal remedy, evaluate the benefit/harm ratio of individual herbal medicines, knows the indications, contraindications, side effects and interactions of herbal medicines, provide patients with valid information and advice on their use.

Course unit contents:

Theoretical classes: Pharmacognosy as a scientific discipline; history and application of natural medicinal products; classification, nomenclature and taxonomy of medicinal plants; morphological and microscopic analysis of medicinal plants; metabolic pathways of biosynthesis of plant metabolites; methods for isolating, separating and characterizing plant metabolites; carbohydrates, amino acids and peptides in pharmacy; heterosides (glycosides); simple phenolic compounds in plants; polyphenolic compounds in plants; coumarins, lignans, lignins and flavonoids; quinone, cyanogenic and sulfur heterozoids; monoterpenic and cardiotonic heteroids; saponosides and tannins; properties, extraction, proving and determination of alkaloids; ornithine, lysine and nicotinic acid alkaloid derivatives; alkaloid derivatives of phenylalanine, tyrosine, tryptophan and histidine; terpene, steroid and purine alkaloids; terpenoids and essential oils; oleoresins, balms and resins; lipids and fatty substances in pharmaceutical practice; production and testing of herbal drugs; phytopreparation formulations and preparation; pharmacological aspects of phytotherapy; routes of administration, interaction, pharmacokinetics and pharmacodynamics of phytopreparations; herbal antioxidants and chemotherapeutics; herbal antimicrobial agents; the use of phytopreparations in functional disorders and diseases of the cardiovascular, respiratory and central nervous systems; hypoglycemic herbal agents; phytopreparations for topical application; toxicity, contraindications and safety of phytopreparations.

Practical classes: Identification, testing of the quality of herbal drugs; morphological and microscopic analysis of medicinal plants; methods of isolating (extracting) secondary metabolites, obtaining extracts; chromatographic analysis of plant extracts; methods for testing the chemical composition of plant extracts; testing of sugars in herbal drugs; testing of mucus drugs; qualitative demonstration (reaction) of particular classes of heterosides; chromatographic and quantitative analysis of individual classes of heterosides; isolation and testing of tannins and saponosides; isolation, qualitative and quantitative analysis of alkaloids; isolation of essential oils; testing of the correct, qualitative and quantitative composition of essential oils; examination of lipids and fatty substances in herbal drugs; analysis of the composition of herbal medicinal products from the market; advising on the rational and safe use of phytopreparations.

Literature:

1. *David Hoffmann, F. N. I. M. H. Medical herbalism: the science and practice of herbal medicine. Inner Traditions/Bear & Co, 2003.*
2. *Nigel C. Veitch, Michael Smith, Joanne Barnes, Linda A. Anderson, J. David Phillipson. Herbal Medicines. Fourth edition. Pharmaceutical Press, London, UK, 2013.*
3. *McCreath SB, Delgoda R. Pharmacognosy: Fundamentals, applications and strategies. Academic Press; 2017.*

Number of active teaching hours:				**Other classes:**
Lectures: 30	Practice: 30	Other forms of classes: 0	Independent work: 0	

Teaching methods:
Lecture, Discussion, Problem solving, Cooperative learning, Experimental work

Examination methods (maximum 100 points)			
Exam prerequisites	No. of points:	Final exam	No. of points:
Student's activity during lectures	30	Oral examination	
Practical classes/tests		Written examination	70
Seminars/homework			
Project			
Other			

Grading system		
Grade	**No. of points**	**Description**
10	**91-100**	Excellent
9	**81-90**	Exceptionally good
8	**71-80**	Very good
7	**61-70**	Good
6	**51-60**	Passing
5	**0-50**	Failing