



Pharmacy - Integrated academic studies

THIRD YEAR- Semester V

2023/2024.

PHARMACOGNOSY

Name of the course:

PHARMACOGNOSY

The course is evaluated with 5 ECTS. There are 4 hours of active classes per week (2 hours of lectures and 2 hours of practice)

TEACHERS AND ASSOCIATES:

	Name and surname	E-mail address	Academic rank
1.	Jovica Tomović	jovicatomovic2011@gmail.com	Assistant professor
2.	Miroslav Sovrić	sofke-ph@hotmail.com	Assistant professor
3.	Aleksandar Kočović	salekkg91@gmail.com	Assistant

Course structure:

Module	Name of the module	Weeks	Lectures	Practice	Module Coordinator
1	Basics of pharmacognosy. Biosynthesis plant metabolites. Primary plant metabolites. Natural product chemistry. Alkaloids.	7	2	2	Asst. Prof. Jovica Tomović
2	Secondary plant metabolites: glycosides, saponins, tannins. Terpenes and essential oils. Aromatic drugs.	8	2	2	Asst. Prof. Jovica Tomović
					$\Sigma 30+30=60$

Students' knowledge assessment:

The student masters the subject in modules. The grade is equivalent to the number of points earned (see tables). Points are earned in two ways:

EXAM PREREQUISITES: A student can earn a total of 60 points. 30 points during active participation in practical work and 30 points on the tests that include the material of the entire course (lectures and practices).

FINAL EXAM: Written exam 40 points that include the material of the entire course (lectures and practices).

	Points
Pre-exam requirements	60 points
Doing practice work	30 points
Taking progress tests	30 points
Exam requirements	40 points
Written examination	40 points

In order to pass the exam, the student must achieve more than 50 percent of the points in all forms of teaching.

Grades:

The student gains a final grade which describes the quality of his knowledge and the results achieved in the course. The interrelation between points and final grades is given in the following table:

Num. achieved points	Num. grade	Definition
0 – 50	5	UNSATISFACTORY
51 – 60	6	PASS
61 – 70	7	SATISFACTORY
71 – 80	8	GOOD
81 – 90	9	VERY GOOD
91 – 100	10	EXCELLENT

LITERATURE:

Textbook	Authors	Publisher	Availability in the library
Fundamentals of Pharmacognosy and Phytotherapy, 3 rd Edition	Heinrich M, Barnes J, Prieto-Garcia J, Gibbons S, Williamson E.	Elsevier Science. 2018.	YES
Herbal medicine. 3 rd Edition	Barnes J, L Anderson, Phillipson D.	London: Pharmaceutical Press. 2007.	YES
Stockley's Herbal Medicines Interactions: A Guide to the Interactions of Herbal Medicines, 2 nd Edition	Williamson E, Driver S, Baxter K.	Macmillan Distribution. 2013.	YES
Handbook of Drug-Nutrient Interactions	Boullata J, Armenti V.	Humana Press. 2010	YES
Pharmacognosy Fundamentals, Applications and Strategy	Badal S, Delgoda R.	Elsevier Inc. 2017	NO (available online)

All lectures (PowerPoint presentations) are available on the website of the Faculty of Medical Science: www.medf.kg.ac.rs

PROGRAM

FIRST MODULE: BASICS OF PHARMACOGNOSY. BIOSYNTHESIS PLANT METABOLITES. PRIMARY PLANT METABOLITES. NATURAL PRODUCT CHEMISTRY. ALKALOIDS.

UNIT I (FIRST WEEK):

Lectures (2 classes)	Practice (2 classes)
Definition, history, present status, and scope of pharmacognosy. Basic plant biology.	Morphological and anatomical characteristics of the basic organs of the plant organism.

UNIT II (SECOND WEEK):

Lectures (2 classes)	Practice (2 classes)
Plant crude drugs. Classification and identification of herbal and other drugs.	Macroscopic, microscopic, and microchemical analysis of drugs.

UNIT III (THIRD WEEK):

Lectures (2 classes)	Practice (2 classes)
Biosynthesis and classification of plant metabolites. Primary plant metabolites.	Microscopic characterization and identification of starch types according to origin.

UNIT IV (FOURTH WEEK):

Lectures (2 classes)	Practice (2 classes)
Methods in natural product analytical chemistry. Isolation and structure elucidation of natural products.	Basic phytochemical procedures - methods of extraction, separation, and identification.

UNIT V (FIFTH WEEK):

Lectures (2 classes)	Practice (2 classes)
Alkaloids. Derivatives of ornithine and nicotinic acid.	Extraction of alkaloids.

UNIT VI (SIXTH WEEK):

Lectures (2 classes)	Practice (2 classes)
Alkaloids. Derivatives of phenylalanine, tyrosine, and lysine.	Identification of alkaloids by general test and specific test.

UNIT VII (SEVENTH WEEK):

Lectures (2 classes)	Practice (2 classes)
Alkaloids. Derivatives of histidine and tryptophan. Steroid and terpene alkaloids.	Identification of alkaloids by microcrystalline test and <i>TLC</i> method.

SECOND MODULE: SECONDARY PLANT METABOLITES: GLYCOSIDES, SAPONINS, TANNINS. TERPENES AND ESSENTIAL OILS. AROMATIC DRUGS.

UNIT VIII (EIGHT WEEK):

Lectures (2 classes)	Practice (2 classes)
Glycosides. Phenolic and flavonoid glycosides.	Extraction, qualitative and quantitative determination of phenols and flavonoids.

UNIT IX (NINTH WEEK):

Lectures (2 classes)	Practice (2 classes)
Coumarin Glycosides. Quinones.	Qualitative and quantitative determination of coumarins and quinones.

UNIT X (TENTH WEEK):

Lectures (2 classes)	Practice (2 classes)
Cardiac, cyanogenic, and monoterpene glycosides.	Chemical tests for cardiac, cyanogenic, and monoterpene glycosides.

UNIT XI (ELEVENTH WEEK):

Lectures (2 classes)	Practice (2 classes)
Saponosides. Glucosinolates.	Qualitative and quantitative determination of saponosides and glucosinolates.

UNIT XII (TWELFTH WEEK):

Lectures (2 classes)	Practice (2 classes)
Lignans. Tannins.	Qualitative and quantitative analysis of tannins drugs.

UNIT XIII (THIRTEENTH WEEK):

Lectures (2 classes)	Practice (2 classes)
Terpenes and essential oils.	Extraction of essential oils. <i>TLC</i> analysis of monoterpenes.

UNIT XIV (FOURTEENTH WEEK):

Lectures (2 classes)

Aromatic drugs.

Practice (2 classes)

Qualitative and quantitative
analysis of essential oils.

UNIT XV (FIFTEENTH WEEK):

Lectures (2 classes)

Recapitulation

Practice (2 classes)

Recapitulation

LESSON SCHEDULE FOR THE COURSE PHARMACOGNOSY

module	week	date	time	Place	form	course unit title	teacher
1	1				L	Definition, history, present status, and scope of pharmacognosy. Basic plant biology.	Asst. Prof. Jovica Tomović
					P	Morphological and anatomical characteristics of the basic organs of the plant organism.	Asst. Prof. Jovica Tomović Asst. Aleksandar Kočović
	2				L	Plant crude drugs. Classification and identification of herbal and other drugs.	Asst. Prof. Jovica Tomović
					P	Macroscopic, microscopic, and microchemical analysis of drugs.	Asst. Prof. Jovica Tomović Asst. Aleksandar Kočović
	3				L	Biosynthesis and classification of plant metabolites. Primary plant metabolites.	Asst. Prof. Jovica Tomović
					P	Microscopic characterization and identification of starch types according to origin.	Asst. Prof. Jovica Tomović Asst. Aleksandar Kočović
	4				L	Methods in natural product analytical chemistry. Isolation and structure elucidation of natural products.	Asst. Prof. Jovica Tomović
					P	Basic phytochemical procedures - methods of extraction, separation, and identification.	Asst. Prof. Jovica Tomović Asst. Aleksandar Kočović
	5				L	Alkaloids. Derivatives of ornithine and nicotinic acid.	Asst. Prof. Jovica Tomović
					P	Extraction of alkaloids.	Asst. Prof. Jovica Tomović Asst. Aleksandar Kočović
	6				L	Alkaloids. Derivatives of phenylalanine, tyrosine, and lysine.	Asst. Prof. Jovica Tomović
					P	Identification of alkaloids by general test and specific test.	Asst. Prof. Jovica Tomović Asst. Aleksandar Kočović
	7				L	Alkaloids. Derivatives of histidine and tryptophan. Steroid and terpene alkaloids.	Asst. Prof. Jovica Tomović

LESSON SCHEDULE FOR THE COURSE PHARMACOGNOSY

module	week	date	time	Place	form	course unit title	teacher
					P	Identification of alkaloids by microcrystalline test and <i>TLC</i> method.	Asst. Prof. Jovica Tomović Asst. Aleksandar Kočović
					T	PROGRESS TEST 1	
2	8				L	Glycosides. Phenolic and flavonoid glycosides.	Asst. Prof. Jovica Tomović
					P	Extraction, qualitative and quantitative determination of phenols and flavonoids.	Asst. Prof. Jovica Tomović Asst. Aleksandar Kočović
	9				L	Coumarin glycosides. Quinones.	Asst. Prof. Jovica Tomović
					P	Qualitative and quantitative determination of coumarins and quinones.	Asst. Prof. Jovica Tomović Asst. Aleksandar Kočović
	10				L	Cardiac, cyanogenic, and monoterpene glycosides.	Asst. Prof. Miroslav Sovrlić
					P	Chemical tests for cardiac, cyanogenic, and monoterpene glycosides.	Asst. Prof. Miroslav Sovrlić Asst. Aleksandar Kočović
	11				L	Saponosides. Glucosinolates.	Asst. Prof. Miroslav Sovrlić
					P	Qualitative and quantitative determination of saponosides and glucosinolates.	Asst. Prof. Miroslav Sovrlić Asst. Aleksandar Kočović
	12				L	Lignans. Tannins.	Asst. Prof. Miroslav Sovrlić
					P	Qualitative and quantitative analysis of tannins drugs.	Asst. Prof. Miroslav Sovrlić Asst. Aleksandar Kočović
	13				L	Terpenes and essential oils.	Asst. Prof. Miroslav Sovrlić
					P	Extraction of essential oils. <i>TLC</i> analysis of monoterpenes.	Asst. Prof. Miroslav Sovrlić Asst. Aleksandar Kočović
	14				L	Aromatic drugs.	Asst. Prof. Miroslav Sovrlić

LESSON SCHEDULE FOR THE COURSE PHARMACOGNOSY

module	week	date	time	Place	form	course unit title	teacher
					P	Qualitative and quantitative analysis of essential oils.	Asst. Prof. Miroslav Sovrlić Asst. Aleksandar Kočović
	15				L	Recapitulation	Asst. Prof. Jovica Tomović
					P	Recapitulation	Asst. Prof. Jovica Tomović Asst. Aleksandar Kočović
					T	PROGRESS TEST 2	
					E	EXAM (deadline June)	