DISCIPLINE SHEET

ANALYSIS AND CONTROL OF PLANT PRODUCTS

ACADEMIC YEAR

2026–2027

1. STUDY PROGRAM INFORMATION

1.1. Higher education institution	UNIVERSITY OF MEDICINE AND PHARMACY OF CRAIOVA
1.2. Faculty	**PHARMACY**
1.3. Department	PHARMACY II
1.4. Field of study	HEALTH
1.5. Study cycle	MASTER
1.6. Study program/Qualification	CLINICAL LABORATORY AND DRUG ANALYSIS TECHNIQUES/Biomedical analyses specialist

2. INFORMATION ABOUT THE DISCIPLINE

2.1. Name of the discipline			**ANALYSIS AND CONTROL OF PLANT PRODUCTS**				
2.2. Discipline code			LCAM 207				
2.3. The holder of course activities			Andrei BIȚĂ				
2.4. Academic degree – course activities			Lecturer, PhD				
2.5. Employment (base norm/associate)			Base norm				
2.6. The holder of seminar activities			Andrei BIȚĂ				
2.7. Academic degree – seminar activities			Lecturer, PhD				
2.8. Employment (base norm/associate)			Base norm				
2.9. Year of study	**II**	2.10. Semester	**III**	2.11. Type of discipline (content)	**DS**	2.12. Student attendance policy	**DOP**

3. TOTAL ESTIMATED TIME

3.1. Number of credits						**4**
3.2. Number of hours per week	course	1	seminar/practical work	1	total	**2**
3.3. Total hours in the curriculum	course	14	seminar/practical work	14	total	**28**
3.4. Examinations						**2**
3.5. Total hours of individual study						**70**
3.5.1. Study using textbooks, course materials, bibliographies, and notes						**30**
3.5.2. Additional documentation in the library, on specialized electronic platforms, and in the field						**20**
3.5.3. Preparation of seminars/practical works, assignments, reports, portfolios, and essays						**15**
3.5.4. Tutoring						**–**
3.5.5. Other activities (consultations)						**5**
3.6. Total hours per semester (1 credit=25 hours)						**100**

4. PREREQUISITES

4.1. Curriculum	–
4.2. Competences	–

5. CONDITIONS

5.1. For conducting the course	Classroom with audio/video equipment. Preparation of the topic in accordance with the teacher's requirements.
5.2. For conducting the seminary/practical work	Practical work room/online environment. Students should review the theoretical concepts and working methods in the practical work manual before carrying out the work.

6. SPECIFIC COMPETENCES ACQUIRED

PROFESSIONAL COMPETENCES	**PC1.** Establishing procedures for the collection, processing and analysis of samples of plant origin, their archiving. **PC2.** Performing analytical tests on tissues and plant extracts. **PC5.** Demonstration of professional conduct and the ability to integrate into teams to carry out scientific and clinical studies.

TRANSVERSAL COMPETENCES	**TC1**. 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 community development; • to know and apply the ethical principles related to specifics of professional qualification; • to recognize a problem when it comes out and to provide solutions responsible for solving it. **TC2**. Social interaction: • to have respect for diversity and multiculturalism; • to develop teamwork 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. **TC3**. 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. DISCIPLINE OBJECTIVES

GENERAL OBJECTIVE OF THE DISCIPLINE
▪ Acquiring theoretical and practical knowledge regarding the analysis and control of plant products.
SPECIFIC OBJECTIVES
▪ Acquiring knowledge about plant products, from the point of view of general pharmacognostic analysis; ▪ Mastering modern methods and techniques for analysis and control of active principles and plant-based products.

8. CONTENTS

8.1. Course (content units)	No. of hours
1. Pharmacognostic analysis. Identity, purity and quality of plant products: macroscopic, microscopic and microchemical analysis; identification and quantitative determination of active principles.	1
2. Carbohydrates. Simple sugars, polyols, sugar acids. Oligosides. Homogeneous polyholosides (homoglycans). Mixed polyholosides (heteroglycans, polyuronides).	1
3. Lipids used in pharmaceutical technology. Pharmacologically active lipids.	1
4. Alkaloids. Tropane alkaloids. Indole alkaloids. Isoquinoline alkaloids. Quinoline alkaloids. Imidazole alkaloids. Purine alkaloids. Protoalkaloids.	4
5. Aromatic compounds. Phenyl derivatives. Phenylmethane derivatives. Phenylpropane derivatives. Benzopyran derivatives (coumarins, chromones, flavonoids). Lignans. Tannins. Phloroglucinols. Anthracene derivatives.	3
6. Isoprenoids. Atypical monoterpenoids. Essential oils (monoterpenoids, sesquiterpenoids, aromatic derivatives). Cardiotonic glycosides. Triterpenoid saponins. Carotenoids.	4
Total	**14**

REFERENCES

1. Bejenaru L.E., Mogoşanu G.D., Biţă A., Bejenaru Cornelia, Popescu H. (2026) *Farmacognozie generală. Farmacognozie specială: Materii prime naturale cu glucide, lipide, compuşi azotaţi, heterozide, compuşi aromatici*. Ed. Medicală Universitară, Craiova.
2. Bruneton J. (2016) *Pharmacognosie. Phytochimie. Plantes médicinales*, 5e édition, revue et augmentée. Lavoisier TEC & DOC, Paris.
3. Ciulei I., Grigorescu Em., Stănescu Ursula. (1993) *Plante medicinale. Fitochimie şi Fitoterapie*. Vol. I, II, Ed. Medicală, Bucureşti.
4. Hanganu Daniela. (2005) *Farmacognozie. Materii prime naturale cu compuşi aromatici*. Ed. Medicală Universitară „Iuliu Haţieganu", Cluj-Napoca.
5. Istudor Viorica. (1998) *Farmacognozie, Fitochimie, Fitoterapie*. Vol. I, Ed. Medicală, Bucureşti.
6. Istudor Viorica. (2001) *Farmacognozie, Fitochimie, Fitoterapie*. Vol. II, Ed. Medicală, Bucureşti.
7. Istudor Viorica. (2005) *Farmacognozie, Fitochimie, Fitoterapie*. Vol. III, Ed. Medicală, Bucureşti.
8. Locatelli M., Tomczyk M., Dugo Laura, Russo Marina. (2025) *Phytochemicals for health*, 1st edition, Elsevier, London, UK.
9. Mogoşanu G.D., Bejenaru L.E., Biţă A., Bejenaru Cornelia, Popescu H. (2026) *Farmacognozie specială: Materii prime naturale cu compuşi aromatici, izoprenoide, răşini, balsamuri, gudroane, varia*. Ed. Medicală Universitară, Craiova.
10. Oniga Ilioara. (2007) *Farmacognozie. Compuşi terpenici naturali*. Ed. Medicală Universitară „Iuliu Haţieganu", Cluj-Napoca.

8.2. Practical works (content units)	No. of hours
1. General pharmacognostic analysis.	1
2. Analysis and control of carbohydrate products.	1
3. Analysis and control of lipid products.	1
4. Analysis and control of plant products from the alkaloid class.	1
5. Simple aromatic compounds (phenyl derivatives, phenylmethane derivatives, phenylpropane derivatives): analysis and control.	1
6. Benzopyran derivatives (coumarins, chromones, flavonoids): analysis and control of plant products.	1
7. Analysis and control of vegetable products with tannins.	1
8. Anthracene derivatives: analysis and control of vegetable products.	1
9. Essential oils (monoterpenoids, sesquiterpenoids, aromatic derivatives): analysis and control.	1
10. Plant products with cardiotonic glycosides: analysis and control.	1
11. Analysis and control of vegetable products with triterpenoid saponins.	1
12. Carotenoids: analysis and control.	1
13. Global chemical analysis of active principles of plant origin: extraction, separation, identification.	1
14. Phytochemical analysis test.	1
Total	**14**

REFERENCES

1. Biţă A., Mogoşanu G.D., Bejenaru L.E., Bejenaru Cornelia. (2020) *Analiza fizico-chimică a produselor naturale medicinale*. Ed. Medicală Universitară, Craiova.
2. Gîrd Cerasela Elena, Duţu Ligia Elena, Popescu Maria Lidia, Pavel Mariana, Iordache Alina Titina, Tudor Ioana. (2008) *Bazele teoretice şi practice ale analizei farmacognostice*. Vol. I, Ed. „Curtea Veche", Bucureşti.
3. Gîrd Cerasela Elena, Duţu Ligia Elena, Popescu Maria Lidia, Pavel Mariana, Iordache Alina Titina, Tudor Ioana. (2009) *Bazele teoretice şi practice ale analizei farmacognostice*. Vol. II, Ed. „Curtea Veche", Bucureşti.
4. Locatelli M., Tomczyk M., Dugo Laura, Russo Marina. (2025) *Phytochemicals for health*. 1st edition, Elsevier, London, UK.
5. Miron Anca, Aprotosoaie Ana Clara, Cioancă Oana, Trifan Adriana, Hăncianu Monica. (2020) *Fitopreparate în dermato-cosmetologie*. Ed. „Grigore T. Popa", Iaşi.
6. Oniga Ilioara, Benedec Daniela, Hanganu Daniela. (2003) *Analiza produselor naturale medicinale*. Ed. Medicală Universitară „Iuliu Haţieganu", Cluj-Napoca.
7. Popescu Antoanela, Roncea Florentina, Pavalache Georgeta. (2015) *Principii active şi produse vegetale. Aplicaţii în cosmetologie*. Ed. Ex Ponto, Constanţa.
8. Srivastava M.M. (ed). (2011) *High-performance thin-layer chromatography (HPTLC)*. Springer-Verlag, Berlin–Heidelberg.
9. Stănescu Ursula Helena (ed), Hăncianu Monica, Gîrd Cerasela Elena. (2020) *Farmacognozie: produse vegetale cu substanţe bioactive*. Ed. Polirom, Iaşi.
10. Wagner H., Bladt Sabine. (1996) *Plant drug analyis. A thin layer chromatography atlas*. Springer Verlag, Berlin–Heidelberg.

9. CORROBORATING THE DISCIPLINE CONTENT WITH THE EXPECTATIONS OF EPISTEMIC COMMUNITY REPRESENTATIVES, PROFESSIONAL ASSOCIATIONS AND EMPLOYEE REPRESENTATIVES RELATING TO THIS PROGRAM

▪ Mastering modern methods and techniques for analysis and control of active principles and plant-based products.

10. METHODOLOGICAL GUIDELINES

Types of activity	Teaching/learning techniques, materials, resources: lectures, interactive courses, group work, problem-based/project-based learning, etc. Learning, teaching, research, and practical application activities within the discipline are conducted in a blended format.
Course	The following methods are used in combination: lectures, debates, problem-solving.
Practical works	The following methods are used in combination: practical applications, case studies, projects.
Individual study	Before each course and each practical assignment.

11. EVALUATION

Type of activity	Evaluation forms	Evaluation methods	Weight of final grade
Lecture	Formative assessment through tests during the semester Summative assessment during the exam	Written exam. Grades are given on a scale of 1–10. The minimum passing grade is 5.	60%
Practical work	Formative assessment through tests during the semester Summative assessment in the last week of the semester	Oral exam. Grades are given on a scale of 1–10. The minimum passing grade is 5.	20%

Type of activity	Evaluation forms	Evaluation methods	Weight of final grade
Assessment of stage knowledge	Tests during the semester	Test (written). Grades are given on a scale of 1–10. The minimum passing grade is 5.	10%
Individual performance evaluation	Formative assessment through essays, projects, worksheets, applied discussion	Applied discussion	10%
Minimum performance standard	Identification of the main classes of natural compounds of plant origin and the stages of general pharmacognostic analysis.		
Appeals	According to the Student Examination Methodology.		

12. RECOVERY PROGRAM AND CONSULTATIONS

Absence recovery	**No. absences that can recover**	**Place of deployment**	**Period**	**In charge**	**Scheduling of topics**
	3	Official Discipline location	Weekly	All teaching staff	According to the course schedule
Consultation schedule	**No. of hours**	**Place of deployment**	**Period**	**In charge**	**Scheduling of topics**
	2 hours/week	Headquarters of the Discipline	Weekly	Course instructor	Theme of the week

Date of approval: 18th September 2026

Dean,	**Department Director,**	**Discipline Holder,**
Prof. univ. dr. Octavian Croitoru	Prof. univ. dr. Cătălina Gabriela Pisoschi	Şef lucrări univ. dr. Andrei Biţă