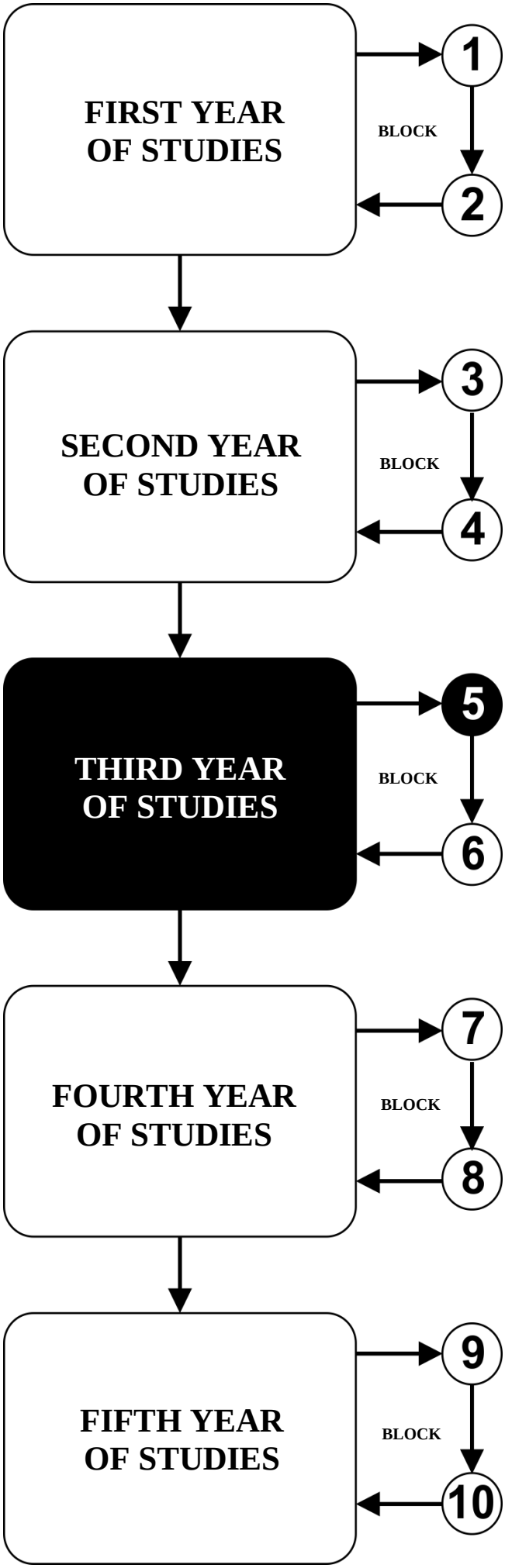
PHARMACEUTICAL TECHNOLOGY 2

INTEGRATED ACADEMIC STUDIES OF PHARMACY

THIRD YEAR OF STUDIES

2024/2025. school year


FIRST YEAR
OF STUDIES
BLOCK
1
2
SECOND YEAR
OF STUDIES
BLOCK
3
4
THIRD YEAR
OF STUDIES
BLOCK
5
6
FOURTH YEAR
OF STUDIES
BLOCK
7
8
FIFTH YEAR
OF STUDIES
BLOCK
9
10

Course unit:

PHARMACEUTICAL TECHNOLOGY 2

This course carries 6 ECTS. There are 5 active weekly classes (3 classes of lectures and 2 classes of practice in a small group).

TEACHERS AND ASSISTANTS:

	Name and surname	Email address	Title
1.	Marina Tomović	marinapop@gmail.com	Full professor
2.	Jovana Bradić	jovanabradickg@gmail.com	associate professor
3	Ана Барјактаревић	ana.radovanovickg@gmail.com	associate professor
4.	Anica Petrović	petkovicanica0@gmail.com	Assistant professor
5.	Marijana Anđić	andjicmarijana10@gmail.com	Assistant
6.	Марко Симић	simic.marko.kg@gmail.com	Teaching assistant

COURSE STRUCTURE:

Module	**Module name**	**Weeks**	**Lectures**	**Practice in a small group**	**Leading teacher**
1	Introduction to biopharmacy, sterile preparations, parenteral preparations, radiopharmacy, cytostatics. Pharmaceutical forms for intravaginal and inhalational use.	7	3	2	Marina Tomović
2	Use of polymers in controlled release systems. Hydrogels, microparticles, nanoparticles of medicinal substances – synthesis, characteristics and use. Microemulsion drug carriers. Modified drug release systems for therapeutic use.	8	3	2	Marina Tomović
					Σ 45+30=75

GRADING SYSTEM:

Student completes the course via modules. Final grade is equivalent to the number of obtained points (see table). The points are obtained in the following way:

PRE-EXAM ACTIVITIES:

ACTIVITY DURING CLASSES: In this way the student can obtain up to 30 points by taking a written test at the end of each module, and, according to knowledge shown, can get 0-14 points for the first module and 0-16 points for the second module.

FINAL EXAM: In this way the student can obtain up to 70 points by taking a test graded accoridng to the table shown.

In order to pass this course, the student must obtain at least 50% of points on each pre-exam activity and also on the final exam. The condition for a student to take the final exam is to pass all of the pre-exam activities first.

MODULE			MAXIMUM POINTS	
		Activity during classes	Final exam	Σ
1	Introduction to biopharmacy, sterile preparations, parenteral preparations, radiopharmacy, cytostatics. Pharmaceutical forms for intravaginal and inhalational use.	14	70	
2	Use of polymers in controlled release systems. Hydrogels, microparticles, nanoparticles of medicinal substances – synthesis, characteristics and use. Microemulsion drug carriers. Modified drug release systems for therapeutic use.	16		
Σ		30	70	**100**

<u>The final grade is formed in the following way:</u>

Number of obtained points	grade
0 - 50	**5**
51 – 60	**6**
61 – 70	**7**
71 – 80	**8**
81 – 90	**9**
91 – 100	**10**

FINAL EXAM

TEST
0 – 70 POINTS

TEST GRADING

The test has 55 questions

40 questions are worth 1 point and 15 questions are worth 2 points

LITERATURE:

BOOK NAME	AUTHORS	PUBLISHER	LIBRARY
Encyclopedia of Pharmaceutical Technology.	Swarbrick J, Boylan JC.	New York, Basel: Marcel Dekker Inc; 2002.	/
Modified-Release Drug Delivery Technology.	Rathbone MJ, Hadgraft J, Roberts MS.	New York, Basel: Marcel Dekker Inc; 2003	/
Drug delivery and targenting	Anya M. Hillery, Andrew W. Lloyd, James Swarbrick	Taylor & Francis, 2001	Yes
Methods of Drug Delivery	Ihler G.M.	Pergamon, 1986	Yes
Surfactants and Polymers in Drug Delivery	Martin Malmsten	New York, 2006.	/
All lectures and practice classes can be found on the Faculty of medical sciences website: www.medf.kg.ac.rs			

THE PROGRAM

FIRST MODULE

Introduction to biopharmacy, sterile preparations, parenteral preparations, radiopharmacy, cytostatics. Pharmaceutical forms for intravaginal and inhalational use.

LESSON 1 (FIRST WEEK):

Lecture 3 classes	Practice in a small group 2 classes
Biopharmacy. Bioavailability. Factors that influence absorption. Pharmaceutical, technological, physical and chemical factors that influence medicinal substance liberation.	Analysis of examples of pharmaceutical, technological, physical and chemical factors that influence liberation of medications.

LESSON 2 (SECOND WEEK):

Lecture 3 classes	Practice in a small group 2 classes
Parenteral preparations, infusions	Analysis of commercially available parenteral preparations

LESSON 3 (THIRD WEEK):

Lecture 3 classes	Practice in a small group 2 classes
Parenteral preparations, injections	Analysis of commercially available parenteral preparations

LESSON 4 (FOURTH WEEK):

Lecture 3 classes	Practice in a small group 2 classes
Total parenteral nutrition	Analysis of commercially available preparations

LESSON 5 (FIFTH WEEK):

Lecture 3 classes	Practice in a small group 2 classes
Cytostatics – pharmaceutical aspects	Analysis of commercially available preparations

LESSON 6 (SIXTH WEEK):

Lecture 3 classes	Practice in a small group 2 classes
Radiopharmaceuticals – pharmaceutical aspects	Analysis of commercially available preparations

LESSON 7 (SEVENTH WEEK):

Lecture 3 classes	Practice in a small group 2 classes

Intravaginal pharmaceutical forms. Inhalation drug use systems.	Analysis of commercially available intravaginal forms. Analysis of commercially available inhalational forms

SECOND MODULE

Use of polymers in controlled release systems. Hydrogels, microparticles, nanoparticles of medicinal substances – synthesis, characteristics and use. Microemulsion drug carriers. Modified drug release systems for therapeutic use.

LESSON 8 (EIGHTH WEEK):

Lecture 3 classes	Practice in a small group 2 classes
Synthesis, topology and isomerism of polymers. Polymer characteristics. Thermal shifts. Mechanical properties and classification of polymers.	Analysis of commercially available, polymer-based preparations.

LESSON 9 (NINTH WEEK):

Lecture 3 classes	Practice in a small group 2 classes
Classification and methods of obtaining hydrogels. Hydrogel characteristics. Mechanical properties and use of hydrogels. Controlled release drug systems for therapeutic use.	Analysis of commercially available, hydrogel-based preparations.

LESSON 10 (TENTH WEEK):

Lecture 3 classes	Practice in a small group 2 classes
Microparticles as drug carriers. Technology of synthetizing microparticles.	Analysis of commercially available, microparticle-based preparations.

LESSON 11 (ELEVENTH WEEK):

Lecture 3 classes	Practice in a small group 2 classes
Nanoparticles of medicinal substances - properties and use. Nanocrystals, nanoporous, magnetic materials, carbon nanotubes. Quantum dots.	Analysis of commercially available, nanoparticle-based preparations.

LESSON 12 (TWELFTH WEEK):

Lecture 3 classes	Practice in a small group 2 classes
Nanoparticle synthesis. Properties of nanoparticles obtained by various methods of synthesis.	Analysis of commercially available, nanoparticle-based preparations.

LESSON 13 (THIRTEENTH WEEK):

Lecture 3 classes	Practice in a small group 2 classes
Microemulsions as drug carriers. Properties and structure of microemulsions.	Analysis of commercially available, microemulsion-based preparations.

LESSON 14 (FOURTEENTH WEEK):

Lecture 3 classes	Practice in a small group 2 classes
Modified drug release preparations	Analysis of commercially available preparations with modified release systems

LESSON 15 (FIFTEENTH WEEK):

Lecture 3 classes	Practice in a small group 2 classes
Chronotherapeutic systems. Gastroretentive therapeutic systems.	Analysis of commercially available preparations

SCHEDULE OF LECTURES & PRACTICE

TUESDAY
15.00-19.00
Hall 2 - Dentistry

LESSON SCHEDULE FOR THE COURSE PHARMACEUTICAL TECHNOLOGY 2

module	week	type	methodological unit name	teacher
1	1	**L**	Biopharmacy. Bioavailability. Factors that influence absorption. Pharmaceutical, technological, physical and chemical factors that influence medicinal substance liberation	Prof. Dr Marina Tomović
		P	Analysis of examples of pharmaceutical, technological, physical and chemical factors that influence liberation of medications.	Ass.Marko Simic Ass.Marijana Anđić
	2	**L**	Parenteral preparations, infusions	Prof.dr Jovana Bradić
		P	Analysis of commercially available parenteral preparations	Ass.Marko Simic Ass.Marijana Anđić
	3	**L**	Parenteral preparations, injections	Prof.dr Jovana Bradić
		P	Analysis of commercially available parenteral preparations	Ass.Marko Simic Ass.Marijana Anđić
	4	**L**	Total parenteral nutrition	Prof. Dr Marina Tomović
		P	Analysis of commercially available preparations	Ass.Marko Simic Ass.Marijana Anđić
1	5	**L**	Cytostatics- pharmaceutical aspects	Prof. Dr Marina Tomović
		P	Analysis of commercially available preparations	Ass.Marko Simic Ass.Marijana Anđić
	6	**L**	Radiopharmaceuticals-pharmaceutical aspetcs	Prof. Dr Marina Tomović
		P	Analysis of commercially available preparations	Ass.Marko Simic Ass.Marijana Anđić

LESSON SCHEDULE FOR THE COURSE PHARMACEUTICAL TECHNOLOGY 2

module	week	type	methodological unit name	teacher
	7	**L**	Intravaginal pharmaceutical forms. Inhalation drug use systems.	Prof. Dr Marina Tomović
		P	Analysis of commercially available intravaginal forms. Analysis of commercially available inhalational forms	Ass.Marko Simic Ass.Marijana Anđić
	8	**L**	Synthesis, topology and isomerism of polymers. Polymer characteristics. Thermal shifts. Mechanical properties and classification of polymers.	Prof. Dr Marina Tomović
		P	Analysis of commercially available, polymer-based preparations.	Ass.Marko Simic Ass.Marijana Anđić
2	9	**L**	Classification and methods of obtaining hydrogels. Hydrogel characteristics. Mechanical properties and use of hydrogels. Controlled release drug systems for therapeutic use.	Prof. Dr Marina Tomović
		P	Analysis of commercially available, hydrogel-based preparations.	Ass.Marko Simic Ass.Marijana Anđić
2	10	**L**	Microparticles as drug carriers. Technology of synthetizing microparticles.	Prof. Dr Ana Barjaktarević

LESSON SCHEDULE FOR THE COURSE PHARMACEUTICAL TECHNOLOGY 2

module	week	type	methodological unit name	teacher
		P	Analysis of commercially available, microparticle-based preparations.	Ass.Marko Simic Ass.Marijana Anđić
	11	**L**	Nanoparticles of medicinal substances - properties and use. Nanocrystals, nanoporous, magnetic materials, carbon nanotubes. Quantum dots.	Prof. Dr Marina Tomović
		P	Analysis of commercially available, nanoparticle-based preparations.	Ass.Marko Simic Ass.Marijana Anđić
2	12	**L**	Nanoparticle synthesis. Properties of nanoparticles obtained by various methods of synthesis.	Prof. Dr Jovana Bradić
	12	**P**	Analysis of commercially available, nanoparticle-based preparations.	Ass.Marko Simic Ass.Marijana Anđić
	13	**L**	Microemulsions as drug carriers. Properties and structure of microemulsions.	Prof. Dr Ana Barjaktarević
		P	Analysis of commercially available, microemulsion-based preparations.	Ass.Marko Simic Ass.Marijana Anđić

LESSON SCHEDULE FOR THE COURSE PHARMACEUTICAL TECHNOLOGY 2

module	week	type	methodological unit name	teacher
2	14	**L**	Modified drug release preparations	Prof. Dr Ana Barjaktarević
	14	**P**	Analysis of commercially available preparations with modified release systems	Ass.Marko Simic Ass.Marijana Anđić
	15	**L**	Chronotherapeutic systems. Gastroretentive therapeutic systems.	Prof.dr Marina Tomović
	15	**P**	Analysis of commercially available preparations	Ass.Marko Simic Ass.Marijana Anđić
		E	**EXAM (june examination period)**	